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ABSTRACT

THIS PAPER EXPLAINS THE DEVELOPMENT OF AN INFORMATION SEARCH AND RECORDING SYSTEM (ISRS) FOR RESEARCH AND DEVELOPMENT ORGANIZATIONS WHICH REQUIRE AN EFFICIENT METHOD OF LOCATING AND RECORDING STORED INFORMATION, INCLUDING LITERATURE SEARCHES BY STAFF MEMBERS. THE SYSTEM WILL ENABLE STAFF MEMBERS TO: (1) LOCATE STORED INFORMATION BY USE OF A CLASSIFICATION AND ADDRESS SYSTEM SPECIFICALLY DESIGNED FOR PROGRAM NEEDS; (2) DEVELOP A GREATER DEGREE OF COMMUNICATION CONCERNING DEVELOPMENTAL ACTIVITIES BY USE OF A COMMON LANGUAGE BUILT INTO THE SYSTEM; (3) DISCRIMINATE IN CHOICE OF PERSONAL READING AND DATA GATHERING MATERIALS BY OBSERVATION OF TYPES OF MATERIAL READ BY OTHER STAFF MEMBERS AND BY EMPHASIZING EXPERIMENTAL RESEARCH RELATED TO PROGRAM; AND (4) KEEP ABREAST OF CURRENT RESEARCH BY REGULAR PERSONAL READING OF EXPERIMENTAL MATERIALS, INCLUDING ABSTRACTS OF MATERIAL READ BY OTHER STAFF MEMBERS. THE SYSTEM CAN BE PLANNED AND PUT INTO OPERATION BY ONE STAFF MEMBER IN APPROXIMATELY THIRTY HOURS PLUS SECRETARIAL TIME. BEFORE THE SYSTEM IS DEVELOPED, CONTACT IS MADE WITH SUPPLIERS OF INFORMATION RETRIEVAL SYSTEMS TO DETERMINE THE FEASIBILITY OF AN AUTOMATIC RETRIEVAL SYSTEM FOR THE ORGANIZATION. IF AN AUTOMATIC SYSTEM IS NOT WARRANTED BY PRESENT INFORMATION NEEDS, THE PROCEDURES AND CONCEPTUAL FRAMEWORK FOR THE NON-AUTOMATIC SYSTEM CAN BE EASILY ADAPTED TO AN AUTOMATIC SYSTEM IN THE FUTURE. (AUTHOR/JB)

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THE DEVELOPMENT OF AN INFORMATION SEARCH AND RECORDING SYSTEM

for research and development organizations

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ABSTRACT

This paper explains the development of an Information Search and Recording System for research and development organizations which require an efficient method of locating and recording stored information, including literature searches by staff members. The system will enable staff members to:

1. Locate stored information, including results of previous literature searches, by use of a classification and address system specifically designed for program needs.
2. Develop a greater degree of communication concerning developmental activities by use of a common language built into the system.
3. Discriminate in choice of personal reading and data gathering materials by observation of types of material read by other staff members and by emphasizing experimental research related to program.
4. Keep abreast of current research by regular personal reading of experimental materials, including abstracts of material read by other staff members.

The system can be planned and put into operation by one staff member in approximately thirty hours plus secretarial time. Before the system is developed, contact is made with suppliers of information retrieval systems to determine the feasibility of an automatic retrieval system

for the organization. If an automatic system is not warranted by present information needs, the procedures and conceptual framework for the non-automatic system can be easily adapted to an automatic system in the future.

Once the system has been planned and implemented, the research staff is trained in 20-minute sessions in the use of the system. Training in the use of ERIC may be included at this time. Continued input to the system is insured by the usual acquisition process for library materials and by additions to the reading review entry system, an information recording method designed specifically for researcher needs.

RATIONALE

Developmental research in all fields relies upon evidence gathered from numerous sources to support principles and practices which are undergoing development. Those engaged in development activities must therefore have access to an efficient means of examining information related to their projects. This paper outlines briefly some problems associated with information retrieval and suggests a system for searching and recording information which supports developmental research (Ammentorp, 1968).

Problems of information retrieval and developmental research

All systems of information storage and retrieval have some method of assigning an index classification or address to a particular piece of information. Thus, a book may be indexed by means of a library number system; personnel records, by employee's last name; project reports, by date of completion. In each case, the address merely insures that the piece of information will have a unique location; it reveals little or nothing about the content of the material which is stored at that address. Because the usual address systems are too general to meet personal information needs, the researcher must use some other means to determine more specifically what is contained at a particular address. He must find some way of translating the concepts of his project into various address systems, abstracting the needed information and recording it for future retrieval by himself or other members of the research staff (Figure 1).

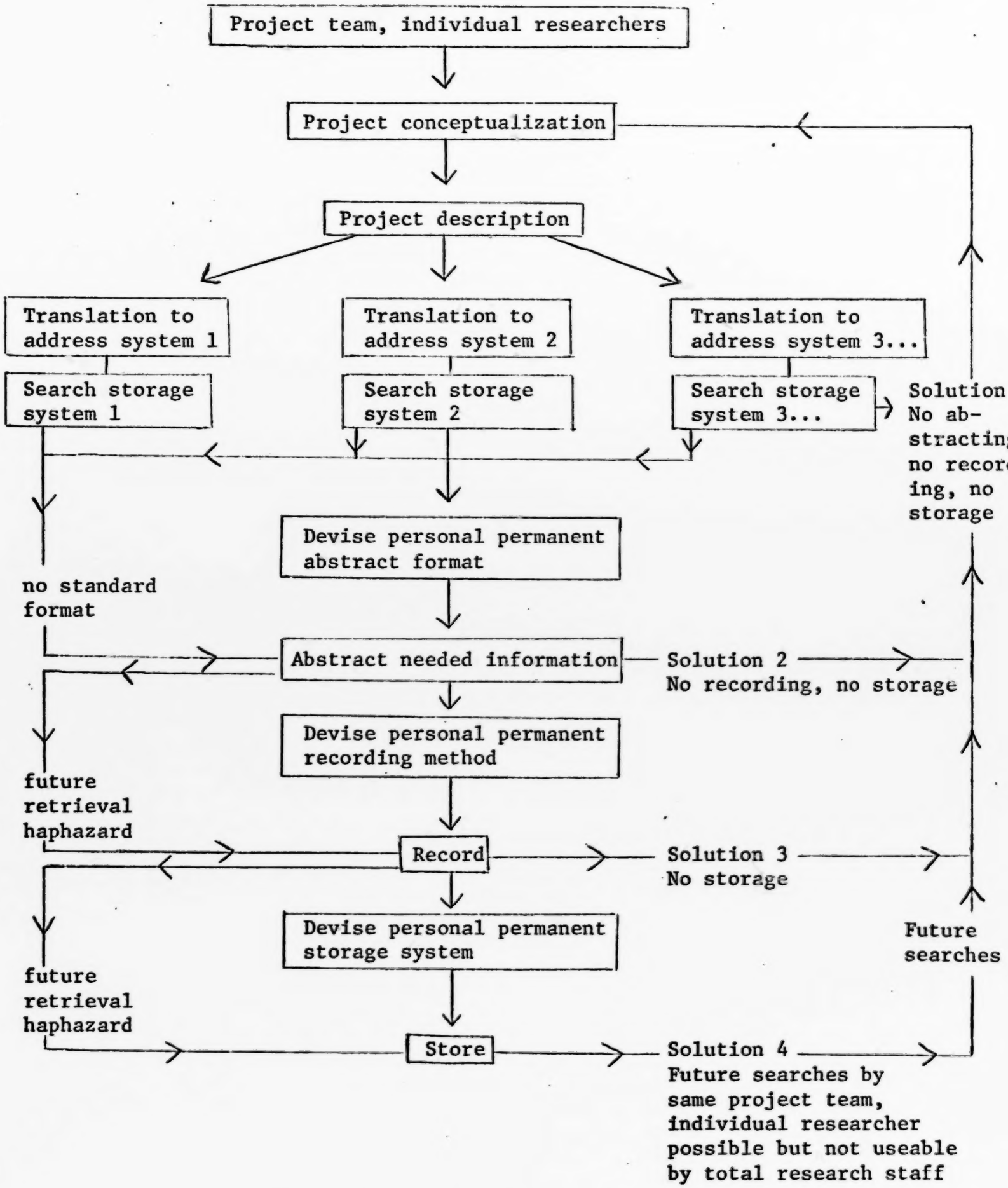


Fig. 1. Researcher information retrieval needs, personal solution.

To meet the needs of individual researchers and the entire research staff, it is therefore feasible for an organization to develop an information retrieval system tailored to its program. The information retrieval system designed for researchers' use will have as addresses those concepts with which they describe their development problem and some provision for recording searched information which will enable them to return quickly to that particular piece of information (Figure 2).

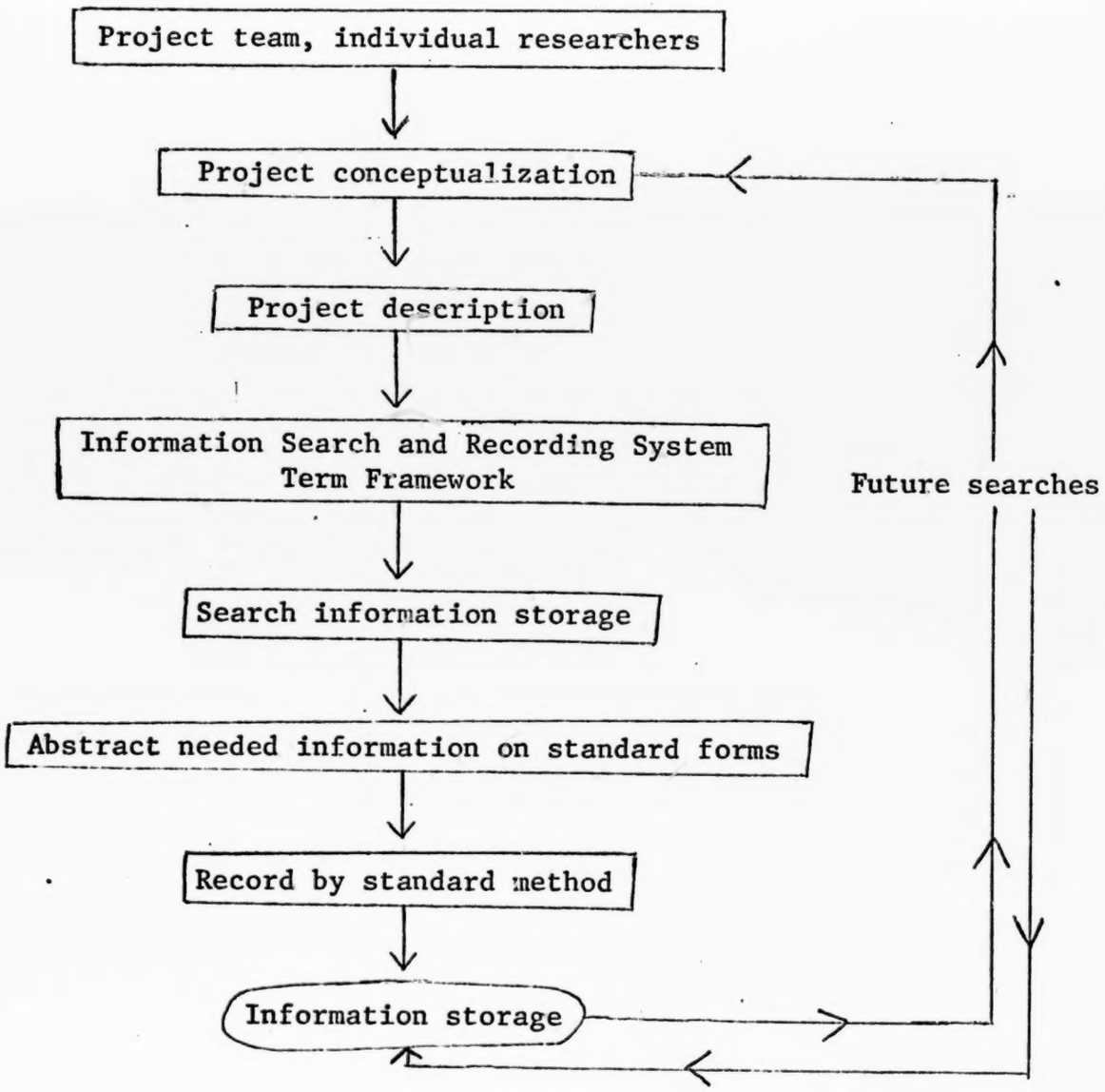
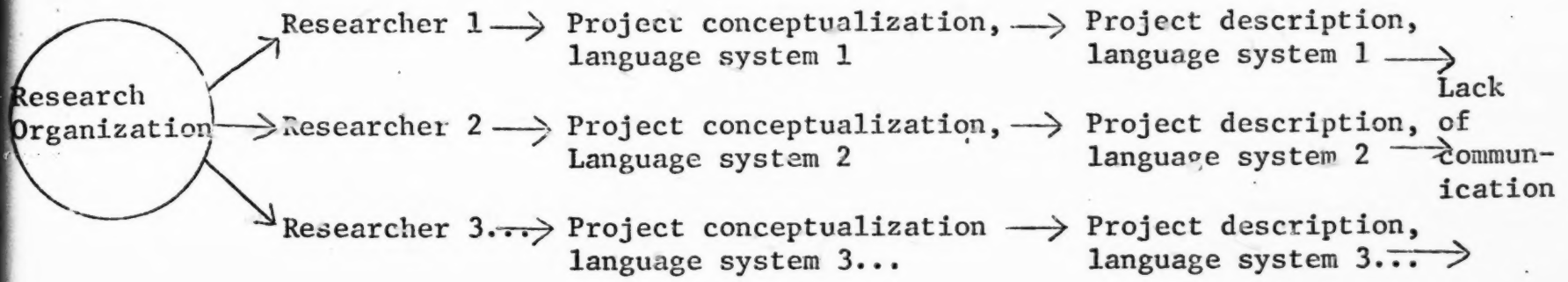


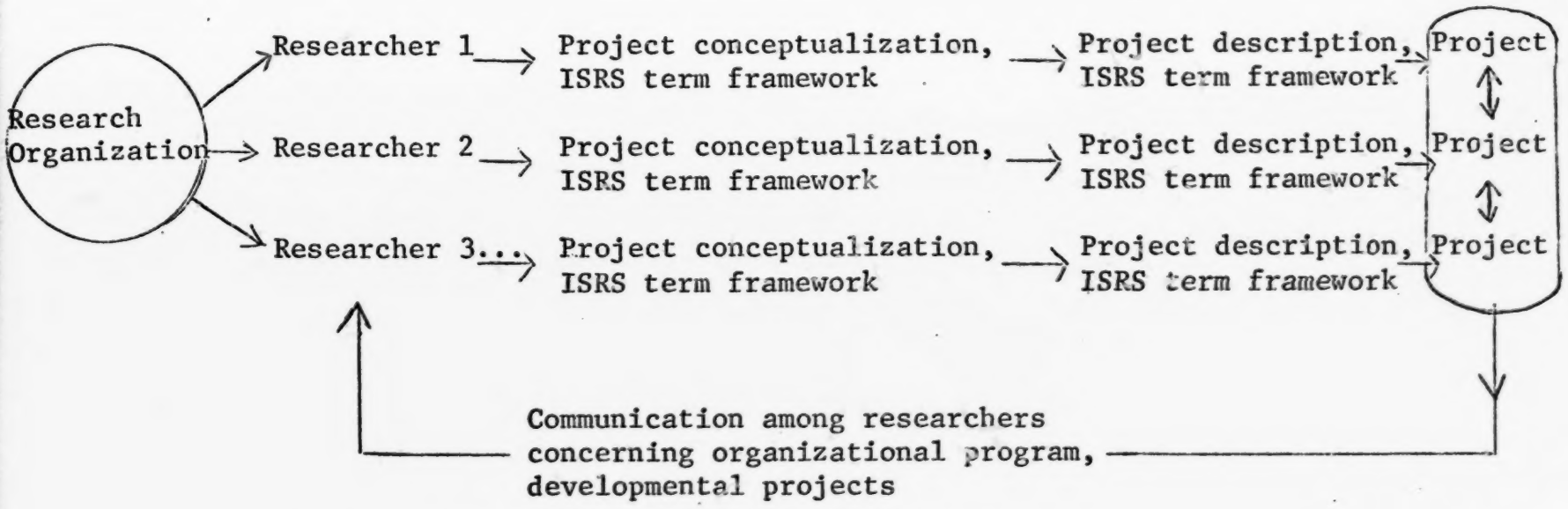
Fig. 2. Researcher information retrieval needs, system solution.

The need for information recall is an important dimension of the efficiency problem in developmental research. Often extensive literature searches are made on a particular problem with only the end result in sight. Information gathered in searches of this type tends not to be retained in a form by which it can be efficiently recalled. At the same time, searches including particular addresses (e.g., a journal article) are not recorded which results in repetitive information forays from one project to the next.

Another problem of information retrieval within a particular organization is that all members of a research team may not use the same concepts and vocabularies to describe the various activities of the developmental program. This is especially true in the field of education which involves many language systems, depending on the particular theories that are subscribed to by individual organizations. A greater degree of communication regarding program activities is a crucial but often overlooked need of the research staff whose members use various terminologies to describe their projects (Figure 3). Therefore, an information retrieval system which ameliorates the intra-communication problems of a research staff will have a common language built into the address system. In order to locate material in the storage system, a researcher must use the terminology of the system. His translation of the concepts of his project into the system's common language is then reinforced by his being able to locate the needed information.



Research organization without system



Research organization with system

Fig. 3. Comparison of communication concerning developmental program in research organizations with and without Information Search and Recording System.

The Information Search and Recording System (ISRS) outlined in the following pages represents an attempt to meet these information retrieval problems within the scope of financial means and human resources available to

low-expenditure research and development operations. In its design the authors have kept in mind the possibility that automated data handling techniques may become available and have used an information subject classification scheme and procedures compatible with such equipment.

DEVELOPMENT

Deriving system objectives

Before designing an Information Search and Recording System especially tailored to its needs, the research organization analyzes its information retrieval problem. Users are identified, individual user and organizational needs are determined, and quantity of stored information, rate of information increase, and development constraints are investigated. It is then possible to substantiate the need for an Information Search and Recording System and to set objectives of the system in terms of behavioral outcomes of the research staff (Figure 4).

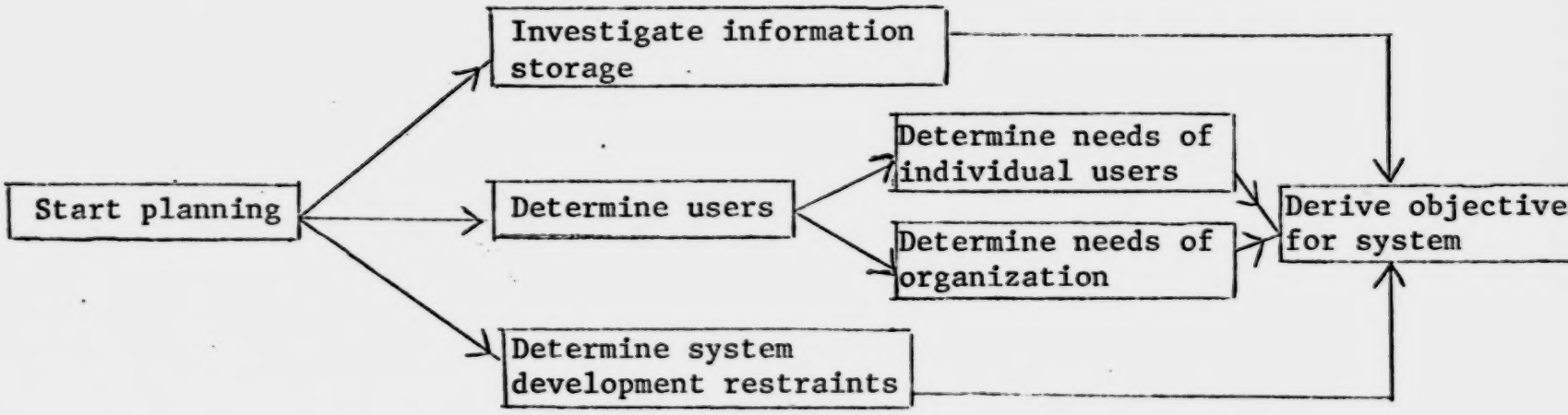


Fig. 4. Deriving objectives for an Information Search and Recording System.

An example of system objectives stated in terms of behavioral outcomes of the research staff is shown below. These are the objectives for the particular system outlined in this paper; research organizations tailoring the system to their specific information needs may well derive different objectives.

Objectives for the Information Search and Recording System (ISRS)

Once ISRS has been implemented, the research team will be able to:

1. Locate stored information, including results of previous literature searches, by use of a classification and address system specifically designed for program needs.
2. Develop a greater degree of communication concerning developmental activities by use of a common language built into the system.
3. Discriminate in choice of personal reading and data gathering materials by observation of types of material read by other staff members and by emphasizing experimental research related to program.
4. Keep abreast of current research by regular personal reading of experimental materials, including abstracts of material read by other staff members.

Before system development begins, the research organization should consider use of automatic retrieval equipment to assist in achieving system objectives. Contact is made with commercial suppliers of information retrieval systems to determine the feasibility of an automatic system for the organization. If it is not warranted by

present information retrieval needs, system development proceeds without the use of automatic devices, but contact should be maintained with such suppliers if it is likely that information retrieval needs will increase. In any case, the procedures and conceptual framework developed for the non-automatic system can be adapted to an automatic system.

The system

The ISRS design explained in this paper has been developed especially to meet the problems of information retrieval in developmental research, as outlined in the Rationale, and specifically to achieve the behavioral outcomes stated above. It consists of two components:

1. An address system "targeted" to the specific needs of the research staff. The address system is a subject classification scheme generated from the focus and direction of the developmental program.
2. An information storage system readily available to the research staff which supports all phases of developmental activity, organizational management and dissemination of research. The information is obtained by the usual acquisition processes of special libraries and a unique reading review entry system.

Both components are explained in detail on the following pages (Figure 5).

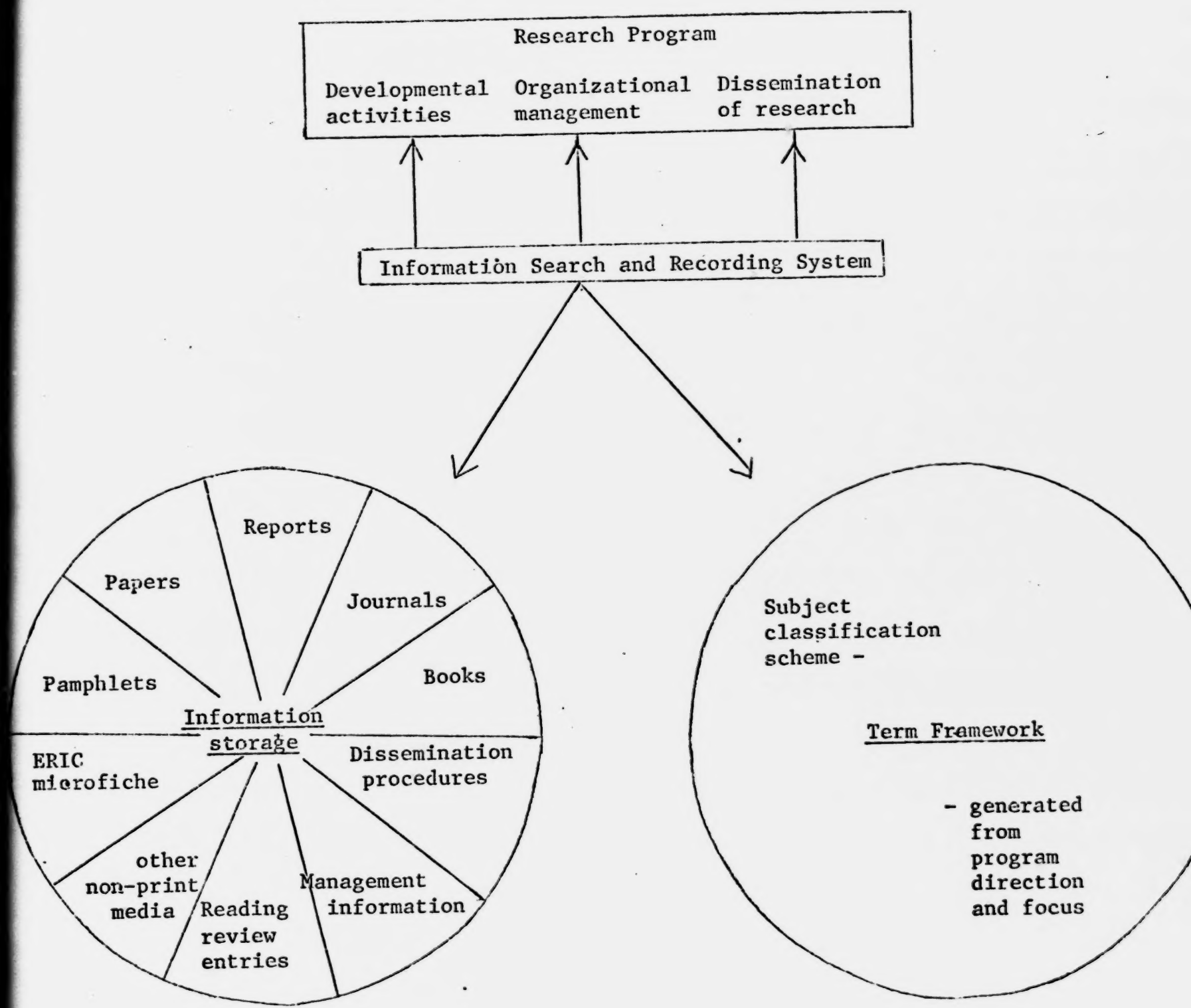


Fig. 5. The Information Search and Recording System supports all aspects of the research program.

The term framework

The address system tailored to meet the information needs of the research staff is a framework of precise terms logically arranged which describes the specific research activity of the organization. (The word "term" will be used in this paper to mean a single word or a phrase.) This is the common language built into the system which develops greater communication among staff members concerning the developmental program. The logical arrangement of terms involves several levels of generality. The top level terms, called categories, are intended to store the addresses of information relating to the same general topics. Categories allow for development within the organizational program over a period of time but are specific enough that a change in the main direction of the program will necessitate different categories.

A workable number of categories ranges from five, for a developmental program of very narrow scope, to twenty, for programs of a broad scope. For instance, the number of categories needed to store information needed by a research staff in behavioral engineering is twelve at present:

behavior
curriculum
management
objectives
organizational systems
populations
programmed instruction
reinforcement
research methodology
simulation
stimuli
technology

Some categories are broader in scope and might logically include categories of a narrower scope. However, both terms are established as categories because of the quantity of information in those categories and the need for quick retrieval of specific information. For example, the category

behavior is broader than stimuli, and stimuli might logically be placed as a more specific term under behavior. However, the need for speed in retrieval of information on many aspects of stimuli requires that it be established as a category by itself. Material stored under behavior contains general information, while that stored under stimuli pertains to that specific aspect of behavior (Figure 6).

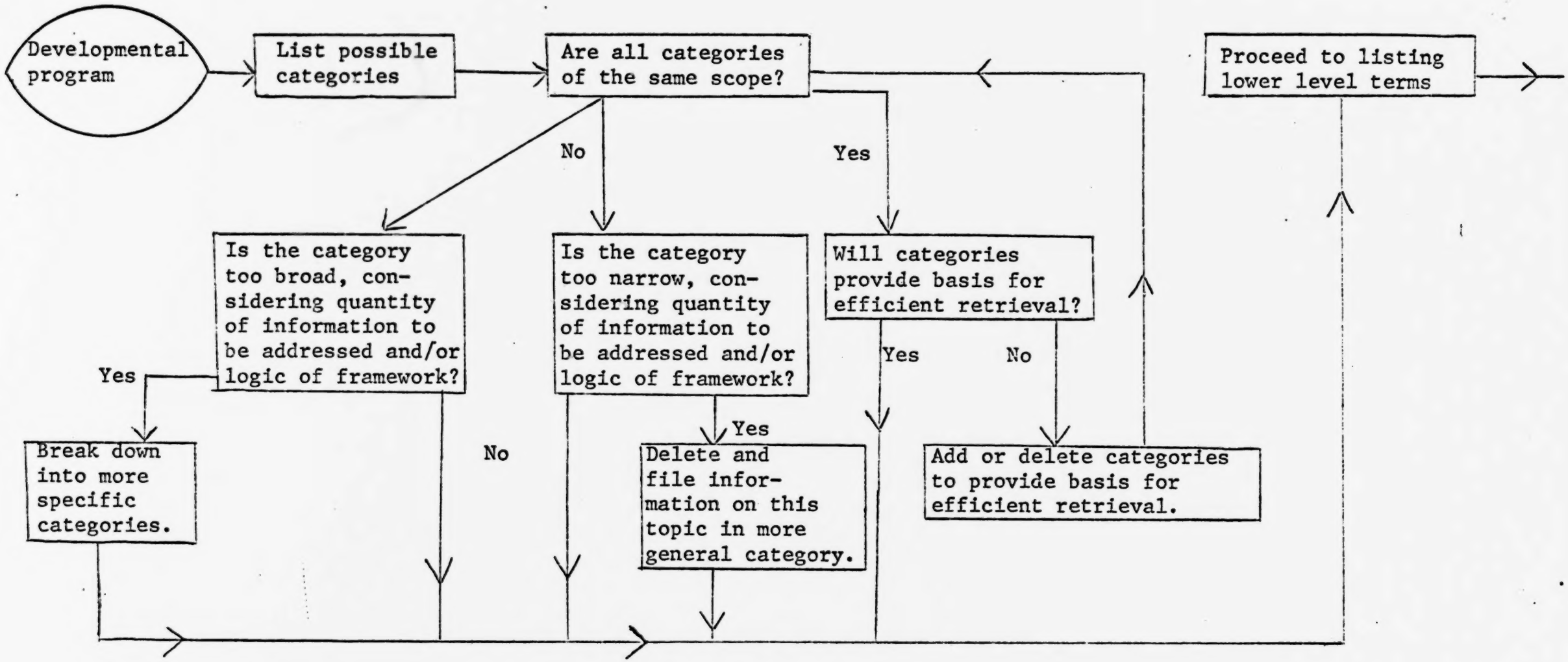

Developmental program
List possible categories
Are all categories of the same scope?
Proceed to listing lower level terms
No
Yes
Is the category too broad, considering quantity of information to be addressed and/or logic of framework?
Is the category too narrow, considering quantity of information to be addressed and/or logic of framework?
Will categories provide basis for efficient retrieval?
Yes
No
Yes
No
Yes
Break down into more specific categories.
Delete and file information on this topic in more general category.
Add or delete categories to provide basis for efficient retrieval.

Fig. 6. Establishing the categories.

Within each category the researcher directs his attention to lower level terms of a more specific nature which are arranged within the category by levels of generality. These terms are expected to change as the program develops, and the process for changing them must therefore be efficient. It will be explained under Changing the term framework.

A workable number of levels below the category terms is from none, for categories which are sufficiently specific at present, to three, which will probably provide sufficient degrees of specificity for retrieval purposes if the categories have been well-chosen (Figure 7).

Category	Level 1	Level 2	Level 3
programmed instruction			
behavior	attitudes and values classes of measurement of		
curriculum	bank content	unipac construction English foreign languages mathematics reading science	
objectives	measurement of	testing	teacher-made standardized

Fig. 7. Examples using no, one, two, and three lower term levels.

Following the usual format of the term framework, these examples would be listed in this way:

programmed instruction

behavior

- attitudes and values
- classes of
- measurement of

} This is one level with three terms in it.

curriculum
- bank
  - unipac construction
- content
  - English
  - foreign languages
  - mathematics
  - reading
  - science

} This is one level with five terms in it.

objectives
- measurement of
  - testing
    - teacher-made
    - standardized

If three levels do not provide sufficient degrees of specificity, a category narrower in scope should be established to avoid an awkward term framework.

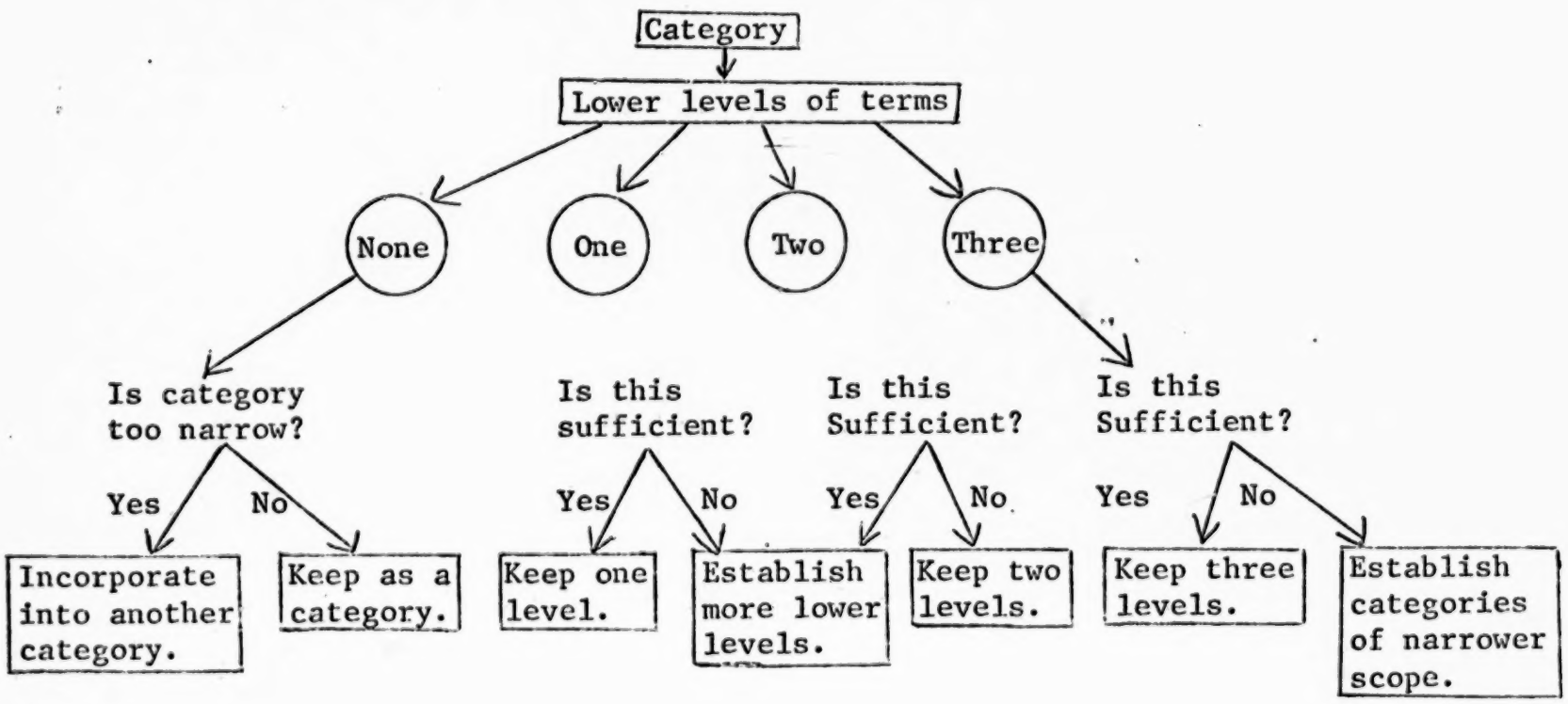


Fig. 8. Establishing the lower term levels.

The term framework enables each researcher to conceptualize and describe his project with the common language system so that he can then use the address system designed for the information needs of the entire research staff. The results of his literature searches are recorded and added to the information storage for future use by himself or other members of the project team (Figure 9).

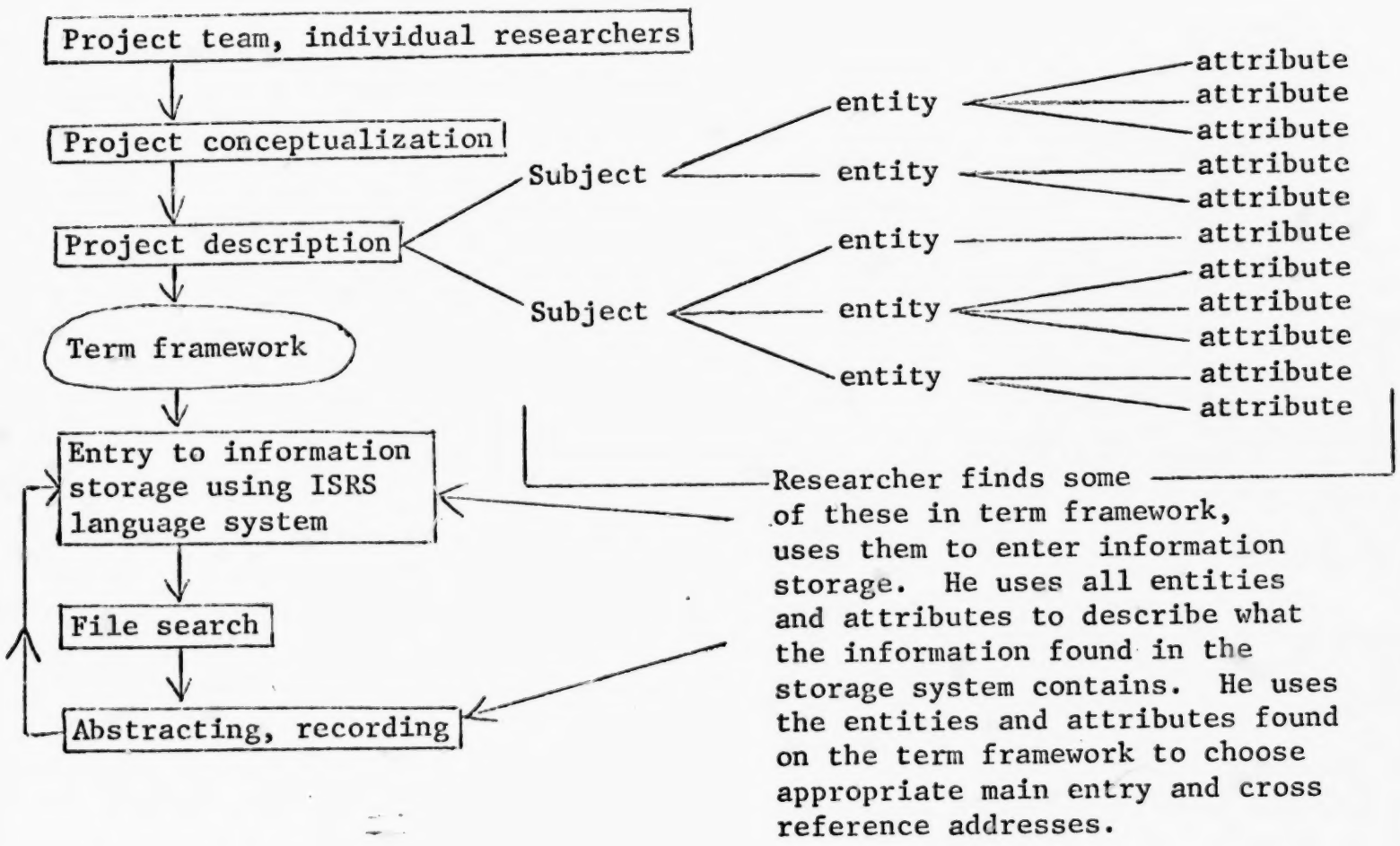


Fig. 9. Researcher use of Information Search and Recording System to enter information storage, describe found information on reading review entries, and indicate addresses for recorded information.

Changing the term framework

When a change in the lower level terms is necessary due to minor changes in developmental activity, refiling within the category is required. If a lower level term is dropped, all addresses filed under that term are refiled under the term one immediate level above. An example would be the deletion of the term PERT located under the higher level term, systems analysis. All addressed information stored under PERT would be refiled under systems analysis. Another example would be the addition of the more specific term dialect under English. The addresses to material on "dialect" filed in English would be refiled at a lower level under dialect (Figure 10). Refiling reading review entries requires additional procedures due to cross reference method (Appendix 6).

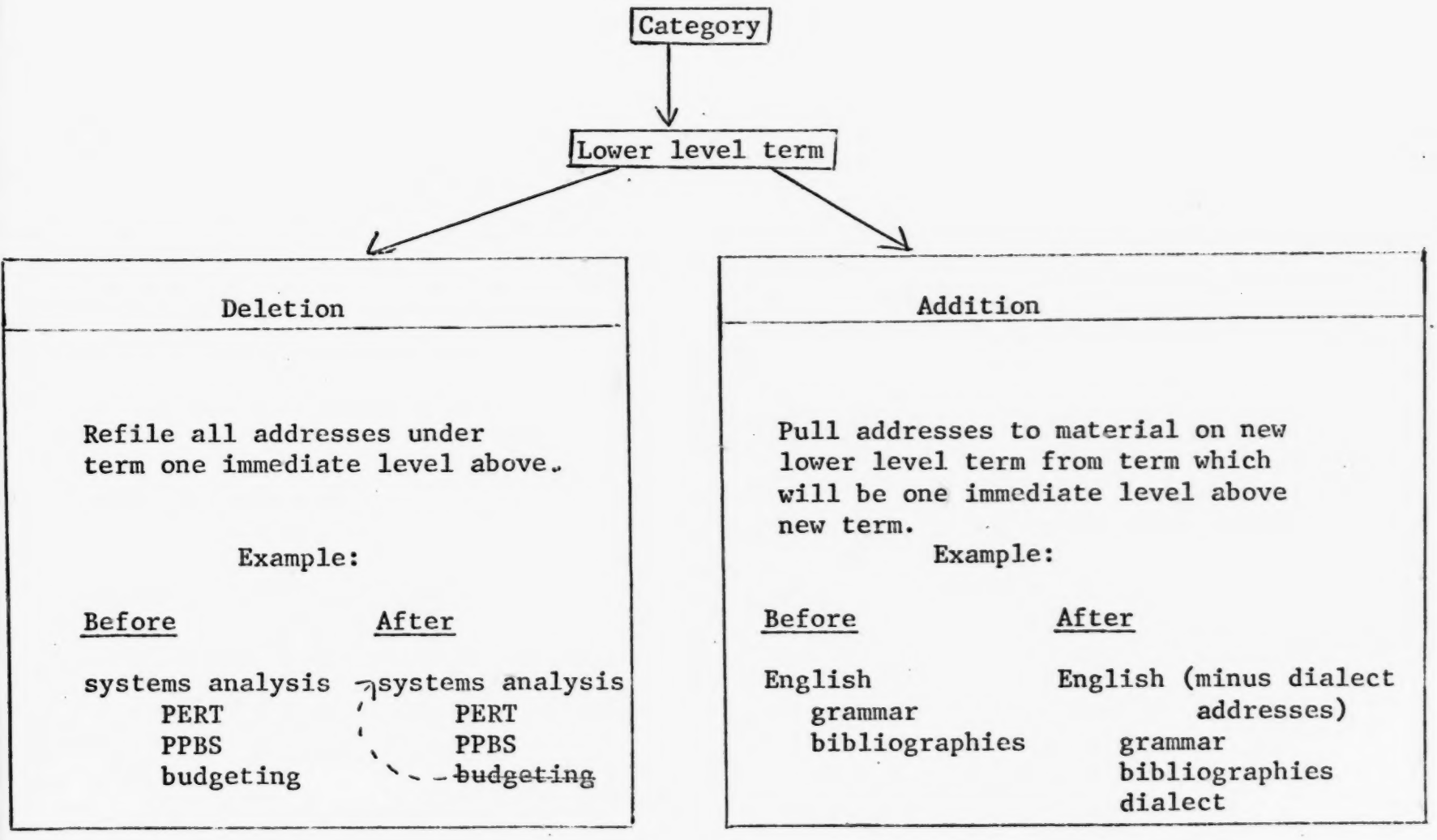


Fig. 10. Changing the term framework.
Addition and deletion of lower level terms.

Coding the term framework

An efficient method of indicating the address of a particular piece of information is to give each term within the framework a unique number. The coding procedure is an especially important consideration if the use of an automatic information retrieval system is likely. It is also a necessary shorthand method with which to indicate cross reference terms, as will be seen below. A workable coding system is to assign each category a one-or two-digit numeral followed by a decimal point. Each level of terms below the category is assigned two digits to the right of the decimal point. Thus, a term on the lowest possible level would have one or two digits to the left of the decimal point and six digits to the right. For example, the code numbers of the following category and lower level terms would be:

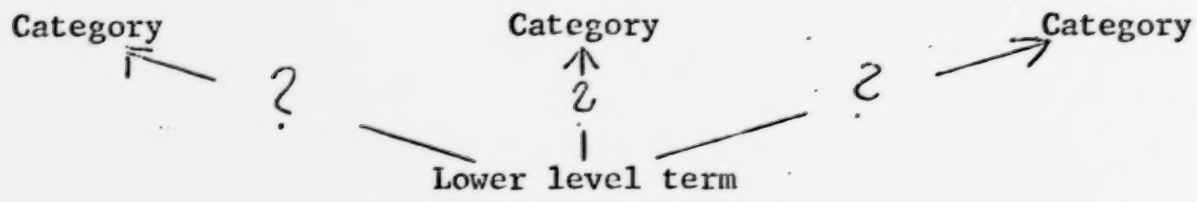
4. 0 0 0 0 0 0	objectives
4. 0 1 0 0 0 0	measurement of
4. 0 1 0 1 0 0	grading
4. 0 1 0 2 0 0	testing
4. 0 1 0 2 0 1	teacher-made
4. 0 1 0 2 0 2	standardized

When listing a series of code numbers, it may be efficient to use only the non-zero digits to the right of the decimal (e.g., 4.01, 4. 0102), although when writing the category number, it is helpful to add two zeroes to the right of the decimal to clearly delineate that this term is a category and not a lower level term (e.g., 4.00, 8.00).

Logic of term framework and cross reference terms

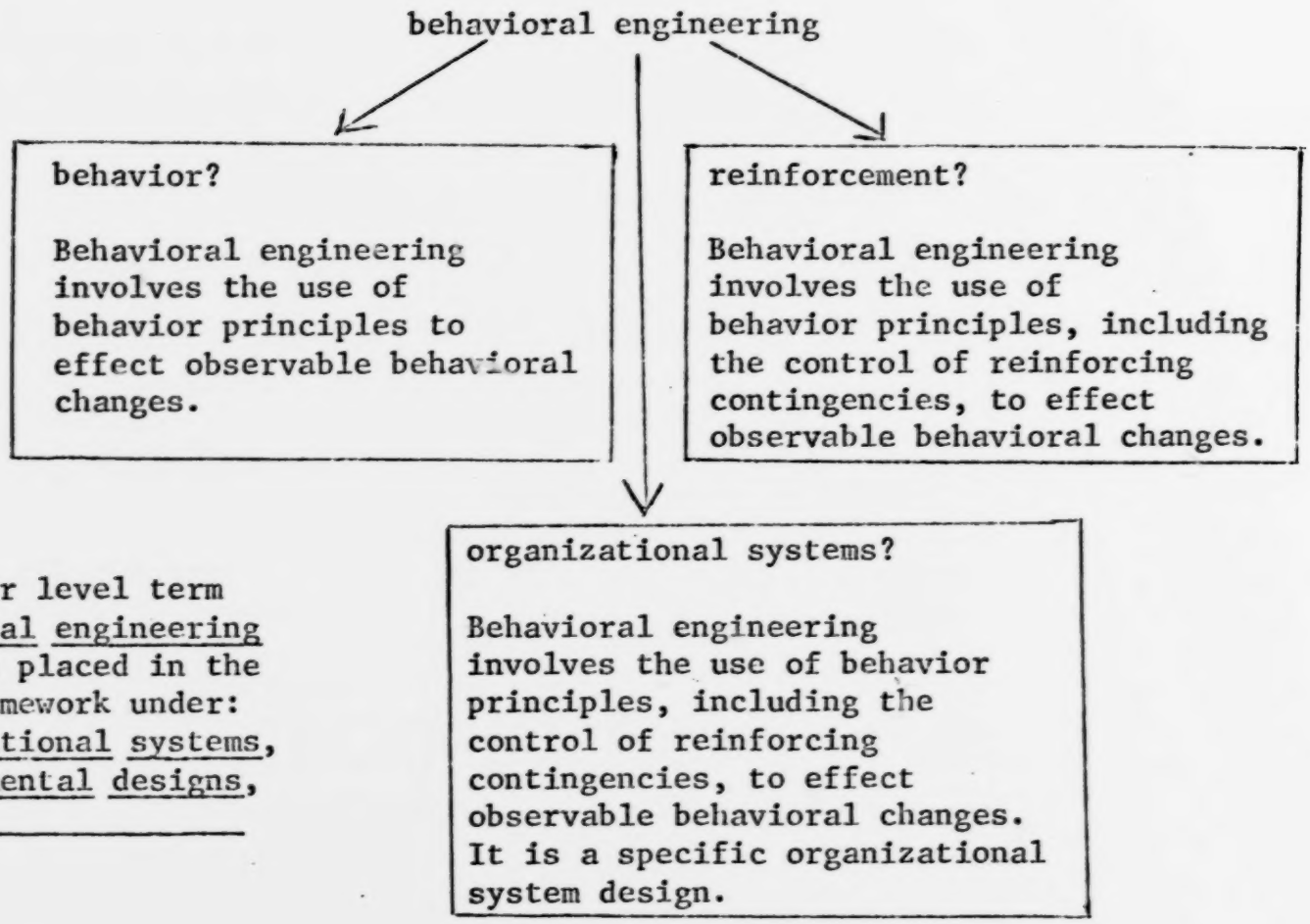
The term framework is available to staff members in a form that allows them to see at a glance the possible addresses under which they may address or locate material. Some terms will relate to more than one

category in the framework, but if the logical base of the framework is clear to the system indexer, there will be one category under which that term fits best. For instance, the term behavioral engineering could be placed under the category reinforcement, lower level term conditioning but since behavioral engineering refers more specifically to an environmental design using the principles of behavior, it is more properly filed under the category organizational systems, lower level term environmental designs. (The lowest level term in any sequence will be double underlined to show that this is the term level at which an address is stored) (Figure 11).



Which category most precisely describes the lower level term?

Example:


behavioral engineering
behavior?
Behavioral engineering involves the use of behavior principles to effect observable behavioral changes.
reinforcement?
Behavioral engineering involves the use of behavior principles, including the control of reinforcing contingencies, to effect observable behavioral changes.
organizational systems?
Behavioral engineering involves the use of behavior principles, including the control of reinforcing contingencies, to effect observable behavioral changes. It is a specific organizational system design.

The lower level term behavioral engineering would be placed in the term framework under: organizational systems, environmental designs,

_____

Fig. 11. Determining the location of lower level terms.

The same "term" (word or phrase) may be used more than once in the framework but only if it refers to different aspects of that term in each location. An example would be the term measurement, or measurement of.

This term is found under the categories behavior, objectives, and research methodology. In the first instance, "measurement of" refers only to the coding and recording of behavior. In the second, it means the measurement of achievement of objectives, e.g., grading and teacher-testing. In the third, "measurement" refers to measurement strategies used in research, e.g., multiple linear regression, correlation, statistical inference.

In spite of these provisions for a logical and precise arrangement of the term framework, there will no doubt be terms which should be followed by some indication of other terms in the framework which address related information. Cross referencing is easily accomplished by listing after the term the code numbers of all addresses containing closely related information. For instance, information on Afro-Americans is addressed under populations, disadvantaged, Afro-American. However, related information is addressed under curriculum, content, English, Afro-American dialect; the code number of the lowest level term Afro-American dialect should be listed as a cross reference for populations, disadvantaged, Afro-American. In this way the researcher may enter the system through one term and be referred to others that would not have occurred to him without the aid of cross references. It is helpful to separate the code numbers from the term by an asterisk (e.g., curriculum* 4.00, 7.0203).

This method of cross referencing should be reserved for those terms that very often address related information. To provide complete addressing of each piece of information, another cross reference method is used

in which separate cross reference entries are filed under the appropriate terms. This procedure is explained below under Entry formats.

Thesaurus

If the problem of usage of various vocabularies by staff members is too complex to be solved by the establishment of a term framework alone, a term index or thesaurus may be developed which will guide system users to the proper terminology for their concepts. The ERIC Thesaurus may be easily adapted for this purpose. The system indexer lists after each ERIC descriptor the code number of the category by which the researcher should locate his information. If it is feasible in terms of time and effort, lower level term code numbers may also be listed. However, this involves great time expenditure and should be carefully considered for its long range usefulness. Once system users become familiar with the term framework and are comfortable using its controlled vocabulary, the thesaurus will be useless for entering ISRS storage except for newcomers to the research staff.

ISRS and other storage systems

The system explained in this paper is an attempt to answer the needs of research organizations which need an efficient method of information retrieval tailored to their developmental programs, information storages, and organizational objectives. No national information network can fulfill these functions; the Educational Resources Information Center (ERIC) provides excellent support for ISRS when integrated into the system as a component of the information storage. However, ERIC attempts to answer the needs of all people in the field of education and therefore

cannot provide a common language system of precise terms targeted to the research staff of a particular organization. Even educational information networks of a more limited scope (e.g., Science Information Exchange [behavioral sciences], ERIC Clearinghouse for Educational Media and Technology) do not meet all the needs of developmental research since they cannot provide the common language system concerning program activities nor a recording method by which the researchers themselves regularly add results of personal literature searches to the information storage. Certainly the more global information networks should be integrated into ISRS in a manner which enables researchers to draw from them the information which will later be abstracted, recorded and addressed in ISRS. However, the large networks cannot substitute for the specially tailored system.

Filing of addresses within each term section

Entries within each term section (i.e., all information stored under research methodology, contingency management, etc.) are filed alphabetically by author's last name. For example, under contingency management, an article by Homme comes before one by Tosti.

The system indexer

The individual (or individuals) who indexes stored information must be a specialist in the subject matter area of the organization. He must understand the focus and direction of the developmental program, for it is from these that the term framework is generated. He must have these knowledges and skills:

1. Know what all the terms mean and how they relate to each other in order to place them in a logical arrangement according to quantity of information stored and specificity required.
2. Be able to scan material rather than look only at title and table of contents to determine main entry and cross reference addresses.
3. Have read enough of the literature in the field to address material correctly.
4. Be able to consistently translate the various language systems used in research materials into the precise terminology required by the organization.

It is helpful for the indexer to list those words and phrases which he must often translate into the system's precise language; this insures consistency in filing information on the same subjects. For instance, the framework may use the terms curriculum, development. Often the words "curriculum improvement" and "curriculum change" are used to describe the same concept as "curriculum development." Therefore, the system indexer lists "curriculum improvement" and "curriculum change" after curriculum, development on the term framework. This framework supplemented by commonly used terms should not be available to staff members who are to use the common language to address and locate material. It simply insures consistency of addressing by the system indexer who classifies the large quantities of information acquired by the organization.

Occasionally the indexer may feel it is necessary to indicate interchangeable terms in the framework available to the research staff. For example, the terms Afro-American, Negro, and black are so commonly interchanged that this may be indicated on the term framework used by the research staff. Any loss of precision in vocabulary is compensated for by the added useability of the framework. It is helpful to separate the interchangeable terms by a slash (e.g., black/Afro-American/Negro). Such interchanges should be carefully considered before indicating them on the framework, since they do result in less vocabulary control.

Entry formats

The Information Search and Recording System may store a variety of materials (e.g., books, journals, papers, reports, brochures, ERIC microfiche and other non-print media, reading review entries, management information, research dissemination procedures) and each type is addressed according to a specific format. The format must be consistently and carefully followed so that accurate bibliographic information is available to researchers. All materials to be indexed are perused by the system indexer who determines main entry and cross reference filing locations within the term framework. The addresses to these materials (excluding the ERIC microfiche) are typed on cards and filed under the proper terms. Within each category and lower level term section, cards are filed alphabetically (Figure 12).

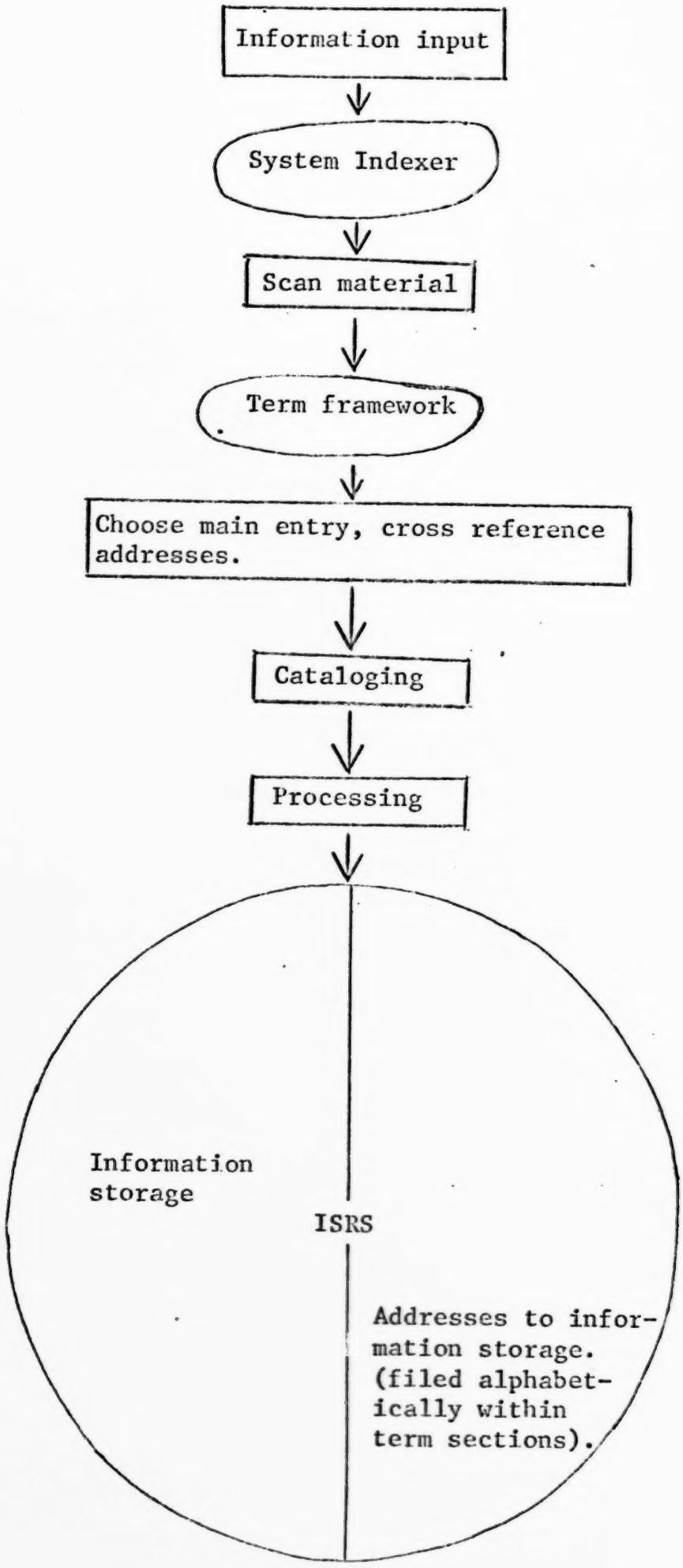


Fig. 12. Functions of the system indexer.

Cross reference cards

Cross reference cards for all materials except reading review entries simply repeat the bibliographic information of the main entry (ME) and indicate both main and cross reference (CR) term locations. The address under which a particular card is filed is indicated by the underlining. (Figure 13). Standard 3 x 5 in. index cards are appropriate for main entry and cross reference address cards with two exceptions:

1. Reading review entry cards should be larger than 3 x 5 in., either 4 x 6 in. or 5 x 8 in. depending on information recording needs. These are filed in a separate card catalog to enable searchers to locate them quickly without having to search the address cards for all stored information indexed under a particular term.

2. If an automatic retrieval mechanism is to be available, the cards prepared especially for that system should be used.

Sk

Skinner, B. F. Science and human behavior.
New York: Free Press, 1953.

ME: behavior, theories of
CR: reinforcement
CR: organizational systems, environmental designs, behavioral engineering
CR: stimuli

(A)

Sk

Skinner, B.F. Science and human behavior.
New York: Free Press, 1953.

ME: behavior, theories of
CR: reinforcement
CR: organizational systems, environmental designs, behavioral engineering
CR: stimuli

(B)

Fig. 13. Card catalog entry. Main entry (A) and cross reference to be filed under reinforcement (B). Main entry and cross references may be xeroxed from one entry and cut and pasted on to 3x5 inch cards. ME and CR are underlined after typing, xeroxing and pasting.

Reading review entries

The address system explained in the preceding pages is used to index all pieces of stored information which support developmental activity, organizational management and dissemination of research. Included within the information storage are the reading review entries, which comprise the most detailed recording method available in the Information Search and Recording System. While every piece of stored information is addressed by the subject matter topics it pertains to, the reading review entries provide much additional information of use to researchers. This is the method by which they can abstract and record needed information in order to locate it quickly at a future date. It also provides a record of professional reading and literature searches carried on by other staff members. By regularly reading the reading review entries, researchers keep abreast of current research material being read by others and are guided in the choice of their own reading material by observation of what others are reading.

The actual material addressed in the reading review entries may be located in a place other than the organization's storage system. Staff members may review and abstract material from personal, public and college libraries. The location of the actual piece of material recorded is indicated on each reading review entry.

Since these entries include abstracts, researchers are able to tell generally what the material contains, and in this way the holdings of the organization's information storage system are supplemented at a very low cost. On the basis of figures obtained from the University

of Minnesota libraries, it costs approximately $6.84 per volume to purchase, catalog, and prepare for the shelf materials received. This cost is exclusive of the purchase price. Of the total processing estimate of $6.84, $2.48 represents the cost of purchasing, and $4.36 represents the cost of cataloging and shelf preparation. Compare this with the average cost of producing one entry for the Information Search and Recording System, shown below. (Remember, too, that reading review entries also provide abstracts of the material, which the regular library card catalog does not.)

Operations per entry	Average time (min.)	Average salary ($)	Cost per entry
Professional staff time, recording reference and abstract on form.	7	$9.00 hr.	1.05
Receptionist's time, typing card from form.	5	2.17 hr.	.10
Administrative assistant's time, scanning for errors, checking filing locations, numbering.	2	3.22 hr.	.10
Clerk typist's time, xeroxing cards on lists for each staff member.	This figure will not be added in because the procedure has no counterpart at other libraries.		
	(1)	(2.36 hr.)	(.04)
Receptionist's time, typing cross-reference cards and author cards. (Average 2 C.R., 2 authors).	2	2.17 hr.	.04
Receptionist's time, filing cards for main location and cross-reference and author cards.	2	2.17 hr.	.04
			$1.33

of Minnesota libraries, it costs approximately $6.84 per volume to purchase, catalog, and prepare for the shelf materials received. This cost is exclusive of the purchase price. Of the total processing estimate of $6.84, $2.48 represents the cost of purchasing, and $4.36 represents the cost of cataloging and shelf preparation. Compare this with the average cost of producing one entry for the Information Search and Recording System, shown below. (Remember, too, that reading review entries also provide abstracts of the material, which the regular library card catalog does not.)

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Administrative assistant's time, scanning for errors, checking filing locations, numbering.	2	3.22 hr.	.10
Clerk typist's time, xeroxing cards on lists for each staff member.	This figure will not be added in because the procedure has no counterpart at other libraries. (1)	(2.36 hr.)	(.04)
Receptionist's time, typing cross-reference cards and author cards. (Average 2 C.R., 2 authors).	2	2.17 hr.	.04
Receptionist's time, filing cards for main location and cross-reference and author cards.	2	2.17 hr.	.04
			$1.33

Reading review entry format

The format of the reading review entries is shown below:

Attributes:			Entity:
Bibliog. Info.:			
Abstract and Comments:			
I read:	Name:	Rating:	Filed Under:
Location of Material:		Excellent Good Fair Poor	ME CR CR CR CR CR

Fig. 14. Reading review entry (main entry).

Explanation of format:

Entry number: Each reading review entry is assigned a unique number. A workable number system is to list the last two digits of the year the entry was filed (e.g., 69 for 1969) followed by a dash and an accession number. An example would be 60-304, meaning that this entry was accessed into the system in the year 1969, and it was the 304th entry that year. The next year, accession numbers will start over (e.g., 70-1, 70-2, . . .).

Attributes and entity: These tell at a glance what the material contains. In a way they provide an "abstract of an abstract".

1. Attributes are qualities of the "thing" talked about in the source.
2. Entity is the "thing". It can be a population, an individual, or a program of action. Entity is "the existence of a thing as contrasted with its attributes" (Webster's Seventh New Collegiate Dictionary, 1965).

Attributes should be in noun form. For example, the attributes of the entity "student" might be "IQ, aggression, withdrawal, physical appearance." Think: attribute of an entity, IQ of a student, frame-writing of programmed instruction, Air Force use of simulation, administrative use of PERT, teacher education use of videotape, teacher use of nonstandard dialect, disadvantaged children's use of nonstandard dialect, positive reinforcement of rat training, etc. ("In" may also be used in the same way, i.e., use of criteria in instructional objectives). Attributes are separated from each other by commas and from the entity by a semicolon (e.g., Afro-American, TESOD, "rapping"; nonstandard dialect).

The words used for attributes and entities are limitless. They are to be distinguished from the framework terms which are limited. The purpose of giving attributes and entity is to tell in some detail what the material contains. The purpose of stating main entry and cross reference terms is to indicate where the material is to be addressed within the term framework. The attributes and entity may contain the

very term used as a main entry filing location, but this is not necessarily so. The material may be so specific that the attributes and entity are much narrower in scope than the terms used in the framework. The attributes and entity aid the indexer in determining addresses but do not dictate addresses. For example, the material to be recorded contains information on the topic of token economies. Specifically, it reports an experiment in a mental institution with chronic schizophrenics, involving automatic dispensers, fines for undesirable behavior, bonuses for extra effort, and a variety of privileges and goods to be purchased. The attributes and entity for this entry are:

chronic schizophrenics, automatic dispensers, fines, privileges, purchases; token economy

The main entry, chosen from the term framework is:

organizational systems, environmental designs, token cultures

The gross reference is:

populations, mentally ill .

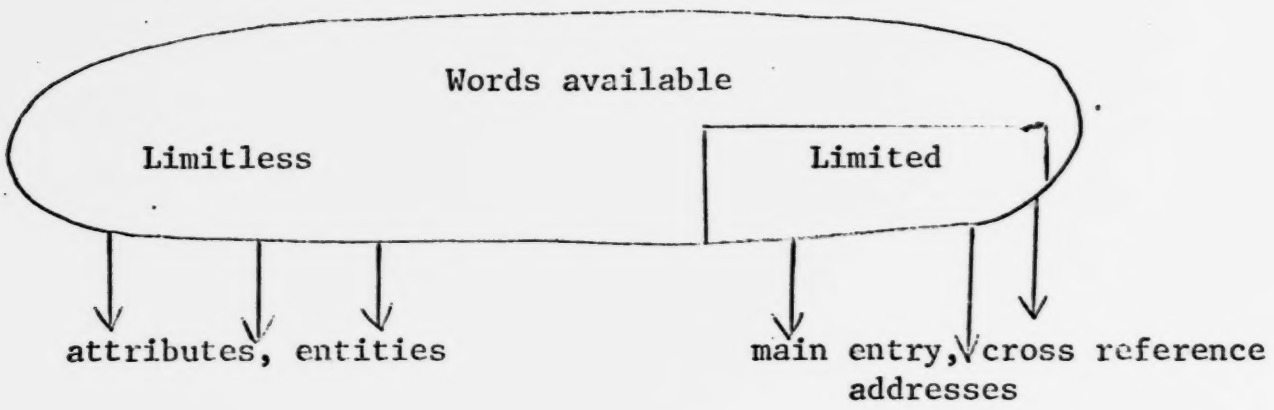


Fig. 15. The relationship of attributes, entities, main entry and cross reference addresses.

Bibliographic information: Standard bibliographic formats for the various types of printed material are consistently and carefully used.

Abstract: The length of an abstract should not exceed the space available on the card after the other information has been given.

Comments: A brief comment by the reader is optional.

I read: The reader indicates the nature of his reading of the material cited in the bibliographic information (e.g., scanned parts and read other parts carefully, read entire article, skimmed entire book).

Location of material: The place at which the actual piece of material can be found (e.g., personal library, Marvin Daley's library, University of Minnesota -- Walter Library [call number E105.6, T13]).

Reader's name: The person who read and abstracted the material.

Main entry and cross references: The reader chooses from the framework the terms under which his entry should be addressed. It is primarily the reader's responsibility to indicate these addresses, because he is

the one who has read the material and can best determine the main entry and cross reference terms. The indexer in charge of the Information Search and Recording System may need to change some of these addresses to insure consistency in filing within the system. However, the research staff should be familiar enough with the terms in the framework to enable them to determine the addresses (Figure 16).

Rating: The reader checks one of the ratings.

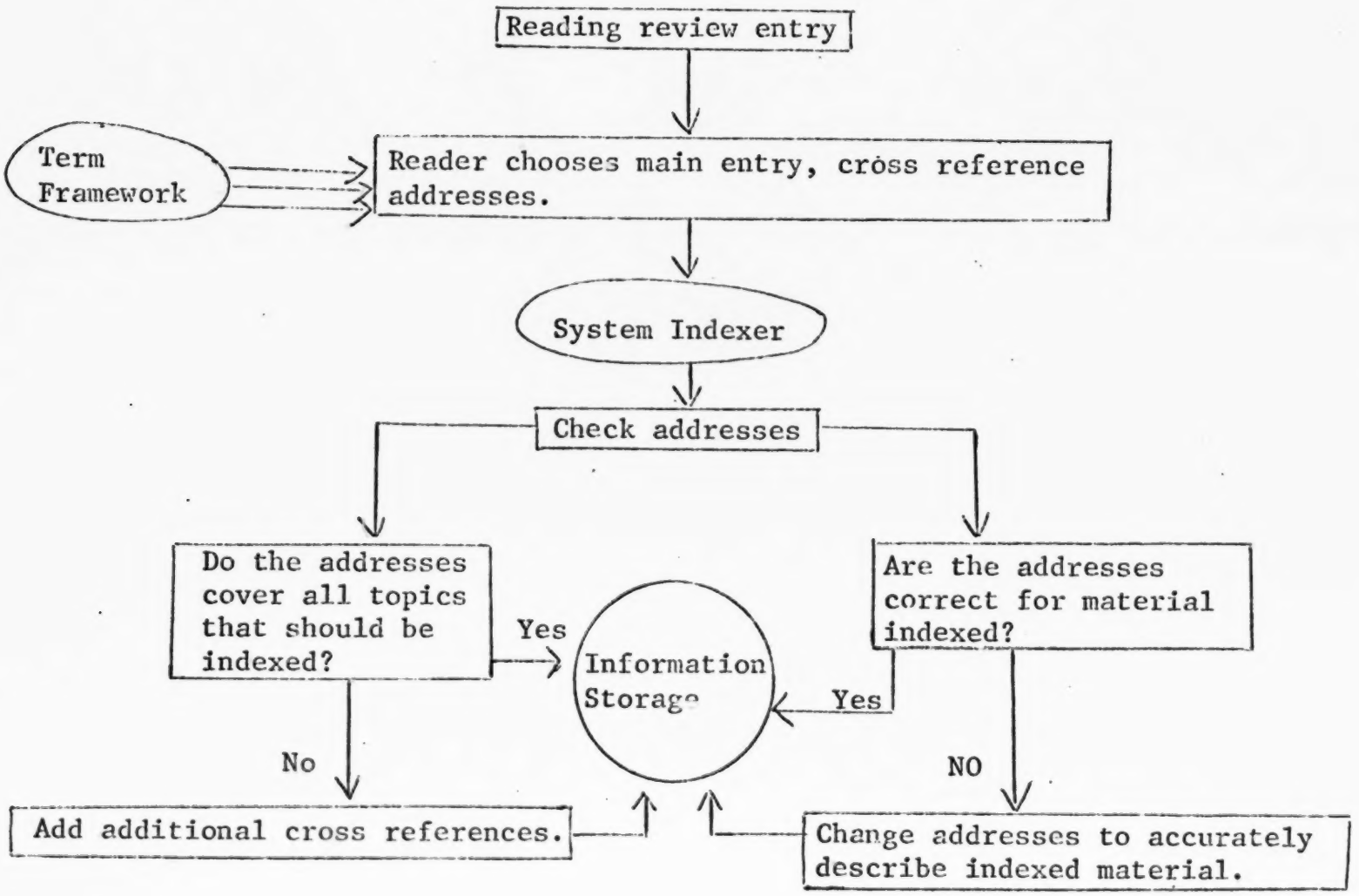


Fig. 16. Function of the system indexer, reading review entries.

Operation of reading review entry system

Staff members program into their research activities time for professional reading and literature searching. They abstract and record information for future retrieval by themselves or other researchers. It is helpful to supply staff members with standard forms on which they can write or type their entries. The standard forms provide stimulus control over researchers which insures their inclusion of all the necessary information and use of standard bibliographic formats. Examples of a standard form and a completed reading review entry are shown in Appendix 1. It is highly desirable for staff members to have copies of reviewed journal articles, papers and short reports obtained at other libraries accessed into the Information Search and Recording System holdings. This is another inexpensive way of supplementing the information storage, and it makes the actual piece of material easily accessible to other researchers. The completed reading review entry form is given a unique number by the system indexer as explained above (e.g., 69-304), and its main entry and cross reference addresses are checked and changed if necessary. The entry is then typed and proofread. (See Flow Chart of Information Search and Recording System Operation -- Reading Review Entries, pp. 42-44).

Cross-referencing reading review entries

Since each reading review entry has a unique number, it is necessary to provide a more complete cross reference code than is used for other stored information. Furthermore, it would be an inefficient use of time if each reading review entry were retyped for every cross reference since much more information is contained than for regular library holdings.

A suitable code is shown below:

Code number of main entry term		Initial of author's last name		Reading review entry number
4.01	-	W	-	69-58
12.021301	-	C	-	69-304

When a researcher is perusing all the reading review entries within a term section, he finds cross reference cards which refer him to the main entry address (Figure 17).

File under: organizational systems, environmental designs, token economies

See: 1.04-W-69-67

Fig. 17. Cross reference address card, reading review entry.

The researcher locates the category and lower level term corresponding to the main entry code number, then goes directly to the initial of the author's last name and looks through all entries under that letter until he finds the reading review entry number indicated by the cross reference card (Figure 18).

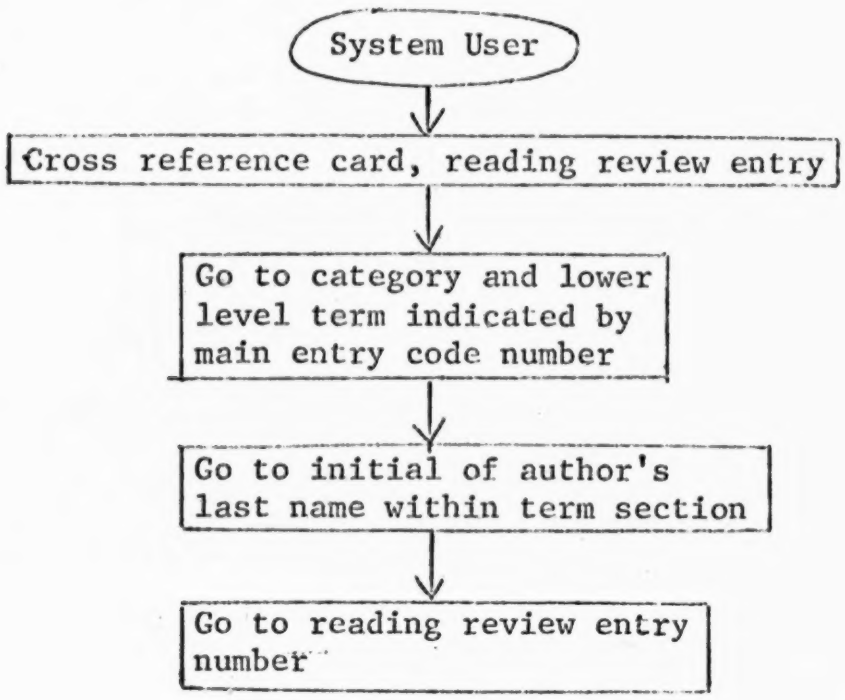

System User
Cross reference card, reading review entry
Go to category and lower level term indicated by main entry code number
Go to initial of author's last name within term section
Go to reading review entry number

Fig. 18. Using the cross reference address, reading review entry.

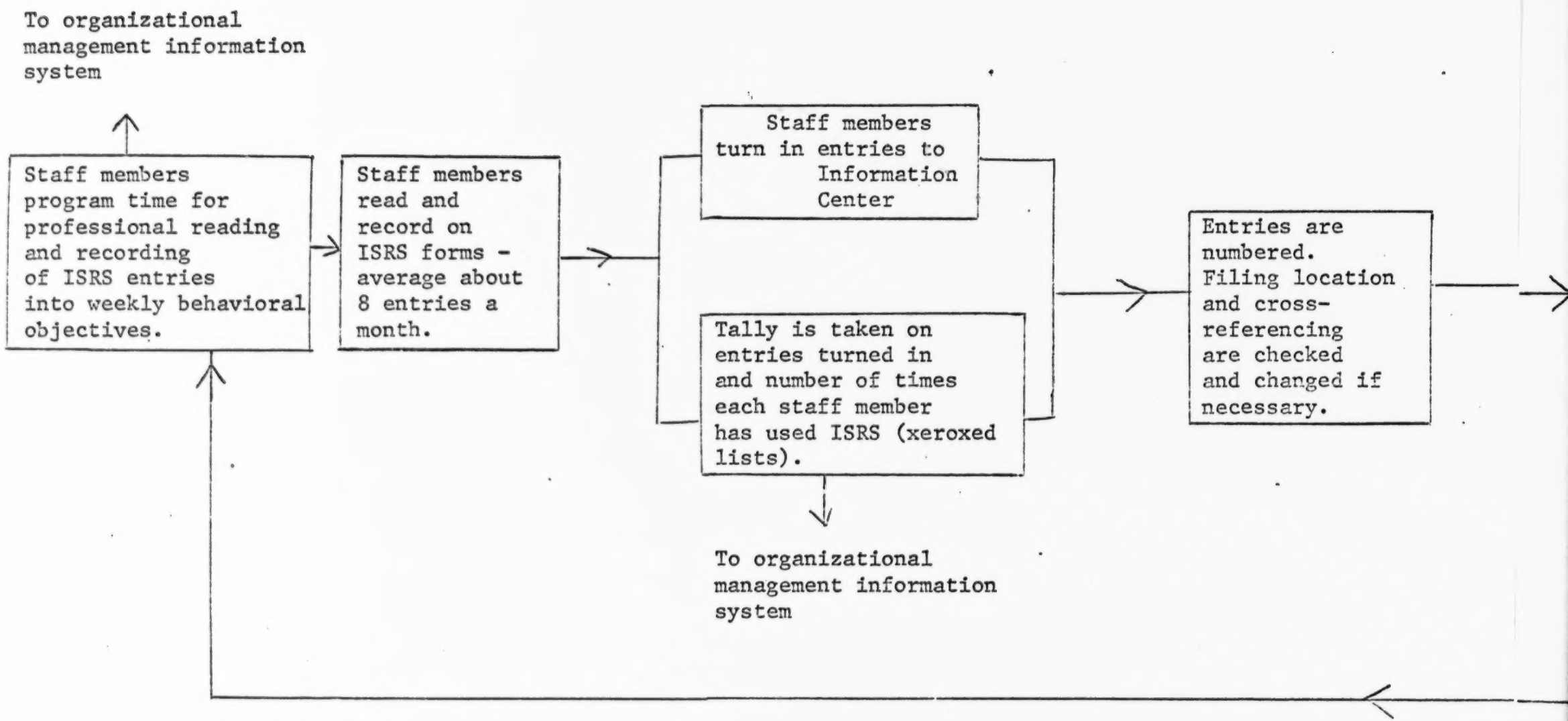
It is obvious that the finding of cross references would be very time-consuming if the reading review entries were numerous. The quantity of stored information would make an automated retrieval device feasible, as the author has substantiated in another paper (Fitch, 1969).

Xeroxing main entry lists

An excellent method of periodically informing staff members of recent additions to the reading review entry system is to xerox sheets of main entry cards for each staff member. These lists serve as reinforcement for staff members who have submitted entries, further communication among researchers regarding developmental activity, offer guidelines for personal reading of research material and inform staff members of current research material read by other researchers. Most staff members cut out the reading review entries that are of special interest to them for a permanent personal file. Without the use of xeroxed lists, many staff members would not be aware of the recent additions to the system, and a good opportunity for fulfilling all objectives of the Information Search and Recording System is missed.

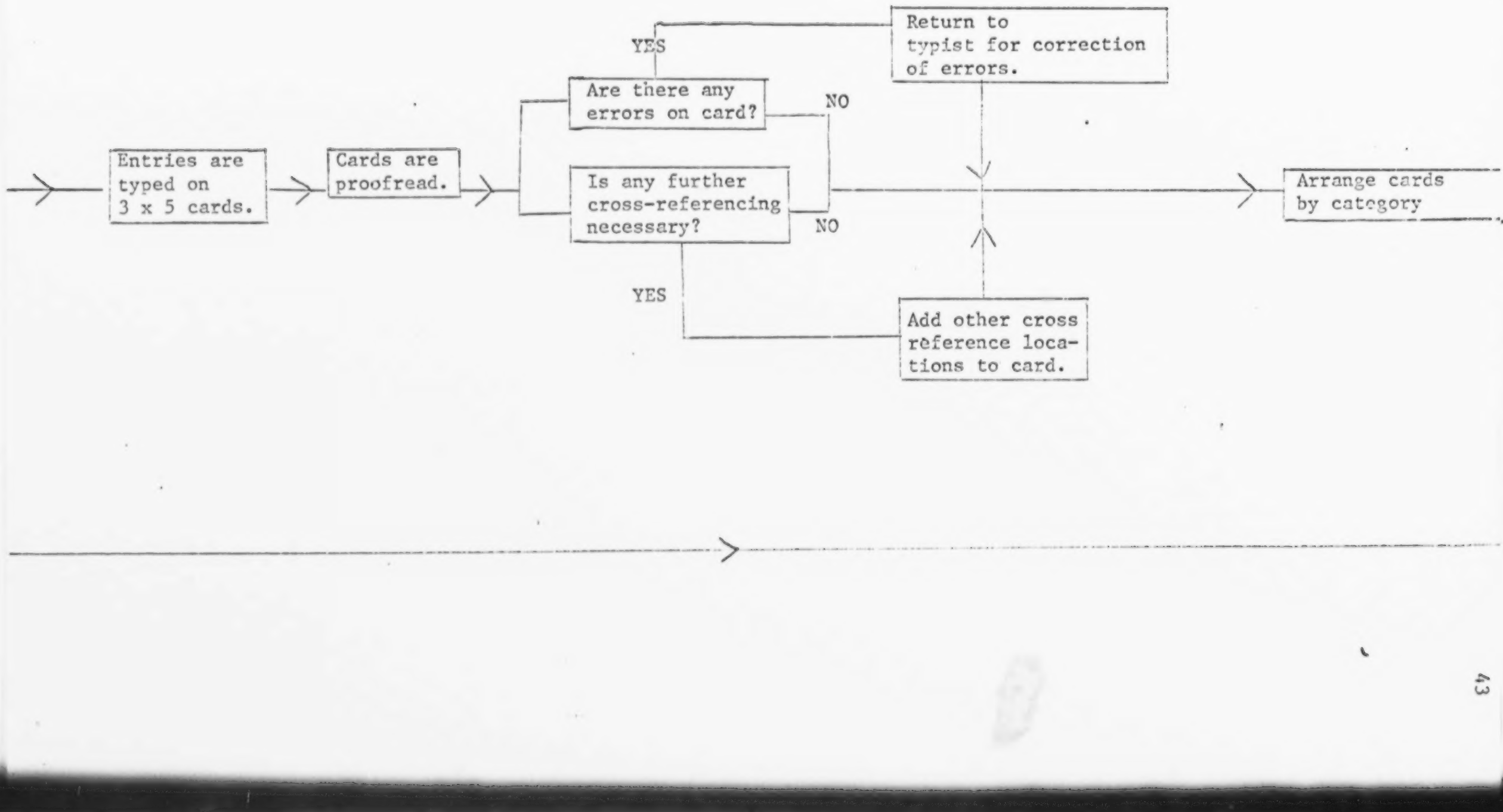
Flow chart of Information Search and Recording System operation

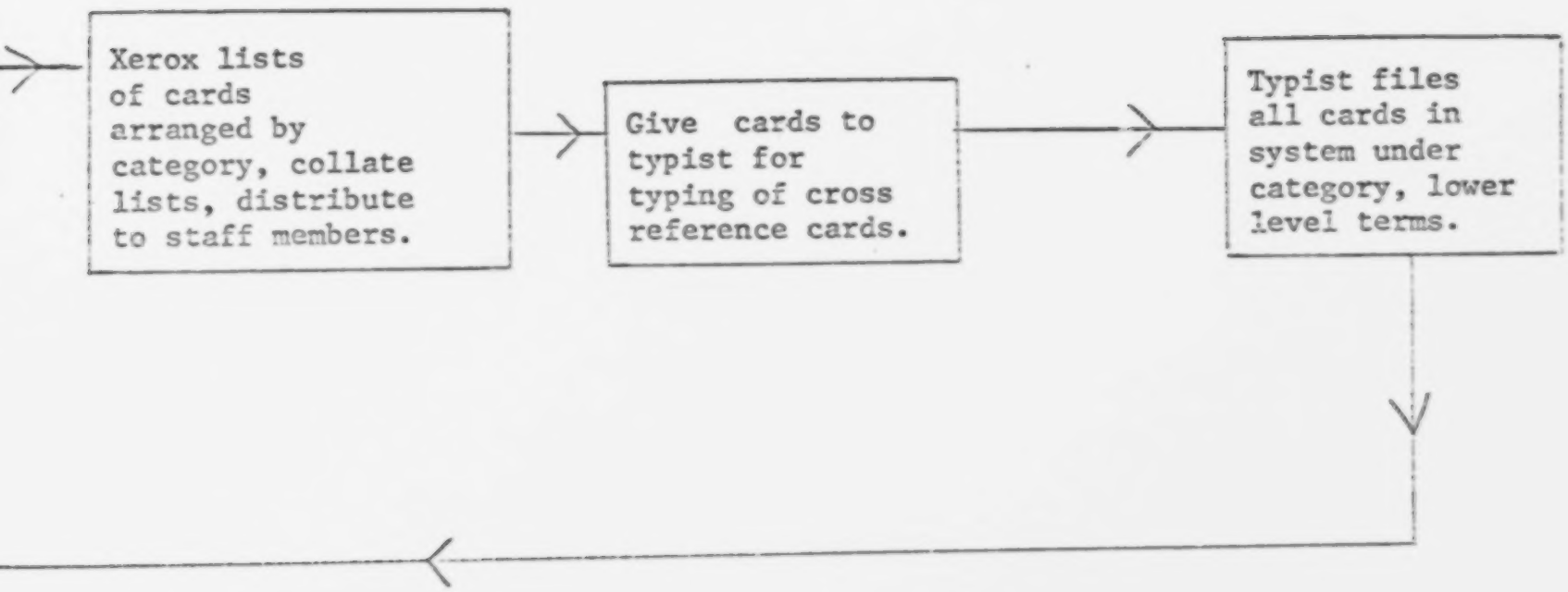
The flow of activities involved in system operation of reading review entries is shown on the following pages.


To organizational management information system
Staff members program time for professional reading and recording of ISRS entries into weekly behavioral objectives.
Staff members read and record on ISRS forms - average about 8 entries a month.
Staff members turn in entries to Information Center
Tally is taken on entries turned in and number of times each staff member has used ISRS (xeroxed lists).
To organizational management information system
Entries are numbered. Filing location and cross-referencing are checked and changed if necessary.

INFORMATION SEARCH AND RECORDING SYSTEM OPERATION

Reading Review Entries


Entries are typed on 3 x 5 cards.
Cards are proofread.
Are there any errors on card?
YES
Return to typist for correction of errors.
NO
Is any further cross-referencing necessary?
YES
Add other cross reference locations to card.
NO
Arrange cards by category


Xerox lists of cards arranged by category, collate lists, distribute to staff members.
Give cards to typist for typing of cross reference cards.
Typist files all cards in system under category, lower level terms.

IMPLEMENTATION

Training sessions

In order to train the research staff in the use of the Information Search and Recording System and especially the reading review entry system, it is helpful to conduct programmed training sessions. Samples of a behaviorally-based 20-minute training session, materials and procedures is given in Appendix 2. Training in the use of ERIC microfiche, indexes and reader-printer may also be included at this time. An ERIC 10-minute training session is given in Appendix 3. Before the sessions can be held, it is necessary to obtain several reading review entries from each staff member. A memorandum explaining the entry format, definition of terms and the term framework is sent about two weeks before the training sessions begin. A deadline for entries is set, and each staff member signs up for a training session. Sessions are limited to five people and should result in specifiable behavioral outcomes in the use of the system.

After the entire staff has been trained when the system is first installed, shorter individual training sessions may be held for members joining the research staff later. Sample materials for these individuals sessions are shown in Appendix 5.

CONTINUED OPERATION

The usual acquisition and processing procedures for stored information continues. A method of obtaining continual input to the reading review entries from all staff members should be considered. If a motivational system is required, it should lock into existing management practices. An example would be the programming of reading time into staff members' weekly behavioral objectives. A certain number of entries (e.g., eight entries a month per researcher) may be suggested, and staff members may be encouraged to spend their reading time at outside libraries.

Trial period for the reading review entry system

Since the time necessary to operate the reading review entry system is greater than for other stored information, a trial period should be established to determine the value of the system in terms of observable behavioral change among staff members. The trial period should be at least two months long. During this time, any means of measuring the system's effectiveness should be used. Some suggestions are:

1. Tallies of entries submitted by each staff member for a given period of time.
2. Tallies of staff members cutting out entries for personal files.
3. Tallies of staff members consulting the system to retrieve information from previous literature searches.
4. Questionnaire to staff on system's effectiveness.
5. Time required for each step of system operation.
6. One-to-one contact with system users to discuss system's strengths and weaknesses.

Flow chart of trial period

A flow of activities during a sample trial period is shown in Appendix 4.

Flow chart of Information Search and Recording System Development, Implementation and Continued Operation

A flow of activities involved in the entire development, implementation and continued operation stages of ISRS is shown on the following pages.

Plan, organize materials, write outlines for, and hold training sessions. Follow guidelines in Development of an Information Search and Recording System. (System Developer)

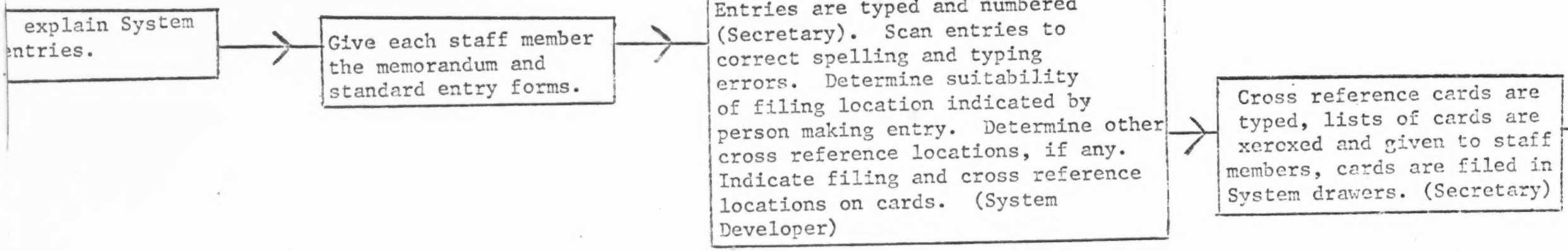
Ask: Do our information needs warrant a Term Index?

No

Make plans for continued operation, according to particular needs and management practices. Follow guidelines in flow chart for operation in Development of an Information Search and Recording System. (Program Director, System Developer). (pages 42-44).

Yes

Develop a Term Index. If ERIC Thesaurus is used, key this to System terms.


explain System
ntries.
Give each staff member the memorandum and standard entry forms.
Entries are typed and numbered (Secretary). Scan entries to correct spelling and typing errors. Determine suitability of filing location indicated by person making entry. Determine other cross reference locations, if any. Indicate filing and cross reference locations on cards. (System Developer)
Cross reference cards are typed, lists of cards are xeroxed and given to staff members, cards are filed in System drawers. (Secretary)

RT FOR DEVELOPMENT
SEARCH AND RECORDING SYSTEM

ng Review Entries

al
n?

No

Maintain contact with company if future information retrieval needs may warrant automatic system.

tems
n

atic
e

Yes

Follow flow chart set forth in Development of an Information Search and Recording System. Adapt to automatic System.

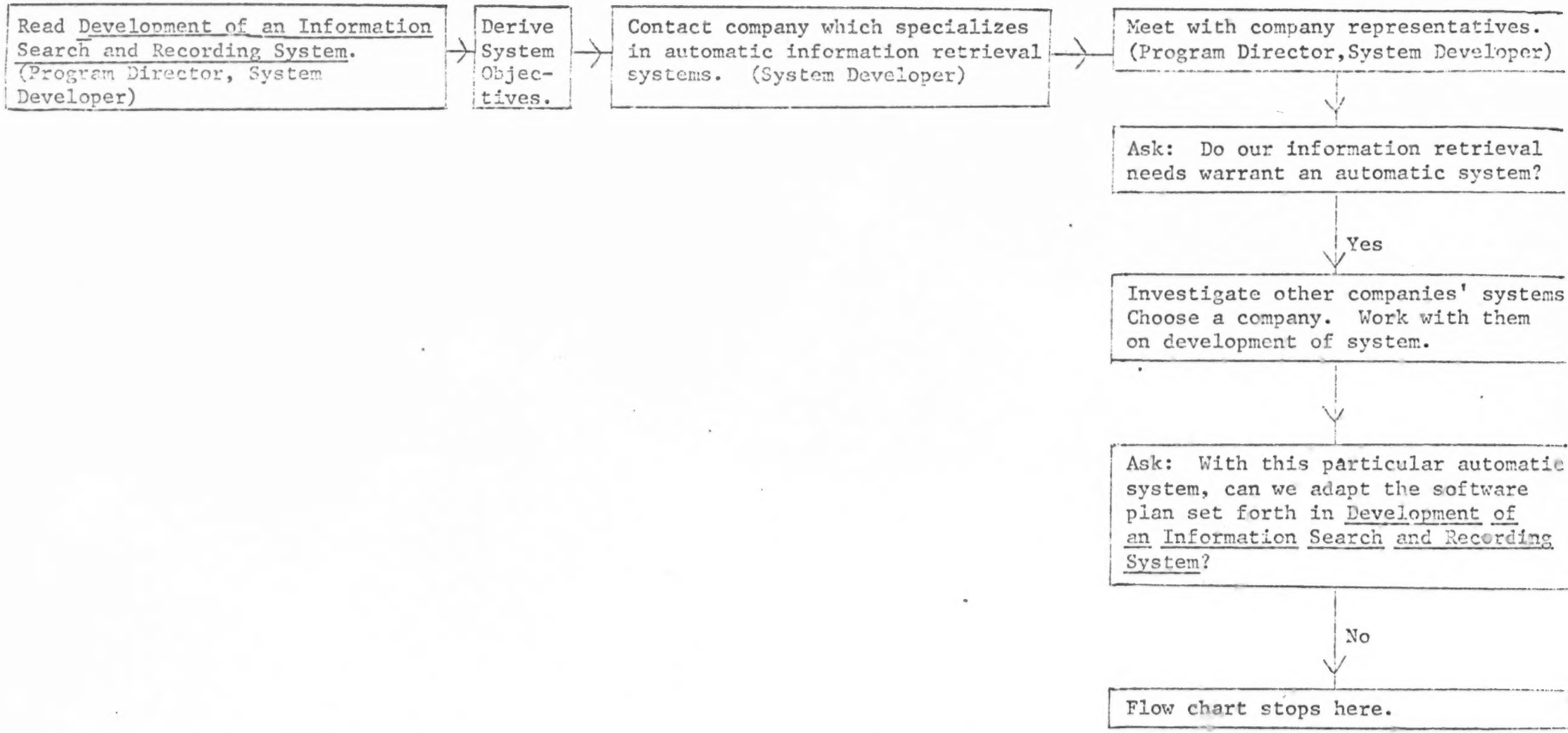
ing

Meet to discuss categories, lower level terms. Establish final term framework. Discuss adaptation of flow chart from Development of an Information Search and Recording System to particular needs. Discuss possible means of getting entries after initial input. Decide manner in which entries will be filed, location of System, who will type and file entries. (Program Director, System Developer)

Write memorandum to
to staff. Request

FLOW CHART
OF AN INFORMATION SE

Reading


Read Development of an Information Search and Recording System. (Program Director, System Developer)
Derive System Objectives.
Contact company which specializes in automatic information retrieval systems. (System Developer)
Meet with company representatives. (Program Director, System Developer)
Ask: Do our information retrieval needs warrant an automatic system?
Yes
Investigate other companies' systems. Choose a company. Work with them on development of system.
Ask: With this particular automatic system, can we adapt the software plan set forth in Development of an Information Search and Recording System?
No
Flow chart stops here.

TIME ESTIMATE FOR NON-AUTOMATIC SYSTEM (Using Development of an Information Search and Recording System as a guide).

	Hours
Reading and studying Development of an Information Search and Recording System.	
Program Director	2
System Developer	8
Deriving objectives.	
System Developer	2
Contacting company which specializes in automatic information retrieval systems.	
Program Director (meeting with company representatives)	2
System Developer (meeting with company representatives, writing letter to establish contact, other arrangements)	3
Meeting to discuss and establish categories, lower level terms and adaptation of flow chart from Development of an Information Search and Recording System. Discuss possible means of getting continued input of reading review entries. Decide manner in which entries will be filed, location of system and person who will type and file entries.	
Program Director	3
System Developer	3
Writing memorandum to explain system to staff, request entries -- follow guidelines in Development of an Information Search and Recording System.	
System Developer	2
Typing memorandum, term framework, drawer tabs, xeroxing memorandum, standard forms.	
Secretary	8
Typing entries from forms, numbering entries.	
Secretary	@ 5 min. per entry
Scanning entries to correct spelling and typing errors, determine suitability of filing locations indicated by person making entry, change main entry and/or cross reference addresses, if necessary.	
System Developer	@ 2 min. per entry

Typing cross reference cards, xeroxing lists of cards, collating and distributing lists, filing cards.

Secretary	@ 2 min. per entry

Planning, organizing materials, writing outlines for and holding training sessions--follow guidelines in Development of an Information Search and Recording System.

System Developer	1 for holding, organizing each session, more if other training is incorporated.
	Planning time for all sessions: 5
All staff members	20 min. each, more if other training is incorporated.

Typing, xeroxing for training sessions.

Secretary	2

Keying Term Index to system terms, if this is to be done.

System Developer	8+ (for ERIC) Thesuaraus, if System Developer knows categories and lower level terms by memory so does not have to refer to list every time.

Continued operation activities:

Keeping tallies on use of system, time for typing, xeroxing, proofreading, etc., as explained in Development of an Information Search and Recording System.	Time depends on the organization's needs and management practices.
Writing memoranda concerning continued operation of System.	
Typing memoranda concerning continued operation of system.	
Meeting of System Developer and Program Director to discuss continued input of entries by staff.	

Continued operation as explained in Development of an Information Search and Recording System (i.e., flow of activities for system operation, changing lower level terms, installation of automatic equipment).

Continuous evaluation and revision.

CONCLUSION

The Information Search and Recording System explained in this paper is an attempt to meet the information needs of developmental researchers. It is a feasible system of classifying and recording information for an organization with limited financial and human resources. The reading review entry system enables researchers to abstract, record and later retrieve information on subjects relevant to their efforts. By reading the entries of other members of the staff, researchers are guided in their personal reading and are able to keep abreast of current research material read by other staff members. Xeroxed lists of entries provide permanent personal files on topics of interest to individual researchers. Reading review entries supplement information holdings by addressing materials located in personal, public and college libraries.

The basis of ISRS, the term framework, is a precisely-worded subject classification which develops use of a common vocabulary by staff members. The categories, which are generated from and lend support to the developmental program, are fairly rigid, but great flexibility is possible at the lower levels. This allows for some change of developmental activities and related information needs within the program.

The system developers proceeded on the assumption that automated equipment might become available to the research organization and used procedures and a subject classification scheme compatible with automatic systems. If a research organization uses these procedures for development and implementation of a non-automatic Information Search and Recording System, all that is required to transfer to certain automated systems

(e.g., Access Corporation's System 60) is the retyping of entries on specially prepared cards. A method of retrieving cross references for the reading review entries other than typing one cross reference per card should be devised to avoid overloading the automatic system.

Each research and development organization whose information needs are met by the system explained in this paper must adapt the system to its particular requirements, information storage and management practices. However, this paper should provide specific guidelines for all steps in the development, implementation and continued operation phases. The authors will welcome questions from organizations seeking a system similar to this one for their specific information retrieval needs.

REFERENCES

American Psychological Association. Publication Manual. (Rev. ed.) Washington, D. C.: Author, 1967.

Bibliographic entries used as examples in this paper follow the format given in this manual.

Ammentorp, W. A. An information search and recording system. Unpublished manuscript, Upper Midwest Regional Educational Laboratory, Minneapolis, 1968.

This paper, which offers a rationale and framework for an information system, was the base from which the present system developed.

Educational Resources Information Center (ERIC). ERIC Thesaurus. (2nd ed.) Catalog No. FS 5.212: 12031-69, April 1969, Contract Nonr OE-12031-69, Office of Education.

This publication may be adapted to provide a term index or thesaurus for the Information Search and Recording System by keying terms in the book to the system's terms.

Fitch, J. P. Rationale for an automatic information retrieval system. Unpublished manuscript, Upper Midwest Regional Educational Laboratory, Minneapolis, 1969.

Hill, R. A. Survey strategy. Draft: November 27, 1968. Modified December 19, 1968, Research for Better Schools, Philadelphia, 1968.

A preliminary paper which system developers consulted in the beginning stages.

Journal of the Experimental Analysis of Behavior.

The format for system reading review entries was adapted from the format of the cards in the back of each journal issue (i.e., attributes and entity are listed in a fashion similar to the terms at the top of each journal card).

Knoblauch, S. Memorandum to the staff on the information search and recording system. Unpublished manuscript, Upper Midwest Regional Educational Laboratory, Minneapolis, December 19, 1968.

A preliminary paper written in the early stages of system development.

Webster's seventh new collegiate dictionary. Springfield, Mass.: G. & C. Merriam Co., 1965.

Definitions of "attribute" and "entity" were taken from this dictionary.

Attributes:

APPENDIX I

(Terms or phrases which describe topic) | (Topic of book or article)

Bibliographic information:

(Author[s] or editor[s])

(Title of book or article)

(Place of publication, if book, or journal title)

(Publisher, if book, or year, volume, number, pages of journal)

Abstract:

Comments:

Suggested related articles (optional):

I read: All of material Other _____	My name:	Rating: Excellent ___ Good ___ Fair ___ Poor ___	ISRS addresses: Main entry _____ Cross reference _____ Cross reference _____ Cross reference (Use ISRS term framework)
Location of material:			

graphic language, basic LOGOS elements

system language for flow chart modeling

Silvern, L. C. LOGOS: A system language for flow chart modeling. Educational Technology, 1969, June, 18-23.

LOGOS is a graphic language used to communicate effectively with readers who prefer words and those who insist on the unambiguous terminology of mathematics. Elementary applications of LOGOS rely on alpha characters forming groups of words or narratives which are combined with LOGOS symbols culminating in a flow chart. LOGOS is a language used in model building. The thought expressed by a LOGOS flow chart is a conceptualization in the form of a graphic analog representing a real life situation. Basic LOGOS elements--function, signal pass, feedback signal pass, feed forward signal pass, special symbology, sequencing and coding--are explained in detail.

Comments: An excellent guide in preparing sophisticated flow charts.

Location: UMREL	Reader: J. Fitch	Rating: Excellent☐ Good☐	ME M-sys CR
Read: Entire article		Fair☐ Poor☐	CR CR

operations research, PERT, PPBS, information systems, system synthesis

systems analysis

Cook, D. L. The impact of systems analysis on education. Paper presented at the seminar on Systems Analysis, Temple University, Philadelphia, Pa., April 18, 1968.

System: Series of interrelated and interdependent parts designed to accomplish a goal or objective. Gives general characteristics of systems philosophy. Application of the systems philosophy in education has been primarily concerned with variables which are readily classifiable. For those who are concerned over the representation of systems by mathematical formulas, an equally valuable way of representing systems is through some type of descriptive flow graph procedure. Specific applications in education include instructional systems, project management systems (PERT and CPM); management information systems (for better decision making); PPBS (includes cost/benefit analysis; PPBS is sometimes confused with program budgeting, which generally refers to a financial accounting system which assigns costs to objectives rather than to traditional categories); and operations research. More time will have to be spent on management, management systems, information management systems, and related topics if educational administrator is to better understand wide variety of systems applications being made.

T-inf
M-PPBS

Location: UMREL	Reader: J. Fitch	Rating: Excellent☐ Good☐	ME M-sys CR M-dec
Read: Entire paper		Fair☐ Poor☐	CR M-ope CR M-PE

APPENDIX 2

Training session in use of ISRS

Each staff member receives a packet of materials at the beginning of the training session which includes:

1. Agenda for the training session including behavioral outcome. (See sample on p. 64).
2. Term framework.
3. Xeroxed list of first set of entries to system.
4. Slips of paper requesting information to be located in system. (See samples on next page).

Behavioral outcome

After attending a training session in the use of the Information Search and Recording System, each trainee will be able to demonstrate this behavioral outcome:

Given a term framework, a slip of paper with information to be found and a pencil, each trainee will be able to locate in the drawer the information requested on the slip of paper and write the address of the information using the code form:

4.602-W-69-58

Sample slips requesting information to be located in ISRS

1 Find the card with information on atomism in Chippewa Indians.

2 Find the card with information on classroom control by Thomas et.al.

3 Find the card with information on criterion score variance.

4 Find a card with information on program budgeting.

5 Find a card with information on evaluative techniques in core curriculum.

Procedure

System trainer:

1. Presents the agenda.
2. Explains behavioral outcome, information request slips, and Term Index (if used).
3. Checks answers of each trainee.
4. Offers guidance where necessary.

The trainer lists the answers to each slip from the appropriate category and term section before each session begins so that he can quickly check trainee answers.

Sample agenda for ISRS and ERIC training sessions

I. Explanation of ISRS

A. Brief explanation of system objectives, holdings, and procedures.

B. Confusing aspects:

1. Immediately after reading material you want a record of for yourself or you know would be of interest to other lab members, fill out a reading review entry form. It is permissible to use journal abstracts but add any pertinent information and comments. To save time, abstracts which you write yourself can be dictated and typed in rough draft form. After you have made any changes in the rough draft, give it to the ISRS secretary for typing on standard cards.

2. Use code numbers for category and lower level terms when indicating filing locations on the form.

3. Cross reference cards for reading review entries use a special code:

Main entry code number		Initial of author's last name		Card Number
4.201	-	W	-	69-58
3.01	-	C	-	69-5

4. If you don't know where to look for information on a topic within the term framework, use the Term Index:

Look up the topic you have in mind in the Term Index (coded ERIC Thesaurus). The ISRS category under which this topic will be found is listed in the Term Index. Locate the category in the system card drawers and you should find information on the topic.

C. Behavioral outcomes of ISRS training session:

Given appropriate page of Term Index, system drawer correspondi to page of Term Index, slip of paper with information to be fou and pencil, each trainee will be able to locate in the drawer the information requested on the slip of paper and write the location of the information using the code form.

II. Explanation of ERIC

A. Brief explanation of use of ERIC microfiche files, indexes, and reader-printer.

B. Demonstrate use of each.

C. Behavioral outcome of ERIC training session:

Given an ERIC index and resume book, slip of paper with information to be found and pencil, each trainee will be able to locate ERIC numbers (no more than two numbers for information requested) and write index page number and resume page number on slip of paper.

Given his ERIC number and the ERIC files and Reader, each trainee will be able to pull the film from the drawer and operate the reader-printer in order to obtain a print-out of the abstract, which he will give to the trainer.

APPENDIX 3

Training Session in use of ERIC

Each staff member receives a packet of materials at the beginning of the training session which includes:

1. Agenda for the training session including behavioral outcomes. (See sample agenda on page 64).
2. Slips of paper requesting information to be located in ERIC indexes and microfiche cabinets and for which the print-out of the abstract will be obtained. (See samples on following page).

Behavioral outcomes

After attending a training session in the use of the ERIC microfiche, indexes and reader-printer, each trainee will be able to demonstrate these behavioral outcomes:

Given an ERIC index and resume book, slip of paper with information to be found and pencil, each trainee will be able to locate ERIC numbers for information (no more than two numbers for information requested) and write index page number and resume page number on slip of paper.

Given an ERIC number and the ERIC files and reader-printer, each trainee will be able to pull the proper microfiche from the drawer and operate the reader-printer in order to obtain a print out of the abstract which he will give to the trainer.

Sample slips requesting information to be located in ERIC

I-5 Find 2 sources on the use of systems--one having to do with education of underachievers, one having to do with open door colleges.

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Available from EDRS _____

II-4 Find 2 sources on the use of linguistics--one having to do with the preparation of teachers, one having to do with the linguistic variable as a structural unit.

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Available from EDRS_____

III-1 Find 2 sources on reinforcement.

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Available from EDRS_____

IV-2 Find 2 sources on classrooms--one having to do with classroom environments, one having to do with classroom techniques.

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Available from EDRS_____

V-3 Find 2 sources on elementary school students, one having to do with the effects of competition and anxiety, one having to do with self-direction.

Number_____ Resume on page_____, _____ (Month), _____ (Year).

Number_____ Resume on page_____, _____, _____.

Available from EDRS_____

Procedure

System trainer:

1. Presents the agenda.
2. Explains behavioral outcomes, information request slips, ERIC indexes, microfiche cabinet and use of reader-printer. (Demonstration).
3. Checks answers of each trainee.
4. Checks print-out of abstract for proper ERIC number.
5. Offers guidance when necessary.

The trainer lists the answers to each slip from the appropriate index before the session begins so that he can quickly check trainee answers. The system trainer gives each trainee the ERIC index in which the information to be located appears. Each index may be coded with a number (e.g., V-3, II-4) which matches the slip number so the system trainer can quickly determine which index contains the specific piece of information.

FLOW CHART FOR INFORMATION SEARCH AND RECORDING SYSTEM (ISRS)

TRIAL PERIOD

APRIL 1 - MAY 31, 1969

Reading review entries

Meeting to set up management of continued input to ISRS (Ammentorp, Daley, Fitch)

April 1, 1969

Time estimate for ISRS, made April 1 - May 31, TRIAL PERIOD, memo sent to Hill asking for secretarial help. Flow chart drawn.

Memo sent to staff explaining system usage tallies. Criterion of more experimental types of material emphasized for System entries.

April 4, 1969

Collect dat
tem is used
members

Collect da
typing syste
on 100 samp
per card.

Collect dat
reading att
abstracts o
card, check
obtaining x
xeroxed art
samples. Es
per entry.

Collect dat
type cross
organize
bredl), xero
weekly
file cards
system.
Estimate:

Staff membe
minimum of
Report to

Collect, or
mation, for
Document 1:
set up ISRS
April 4 -
data later.
Document 2:
recommend I

April 4 -

on number of times sys-
Tally sheet in library, tallies of staff
cutting out reading review entries.

on time needed for
card (Haffenbredl). Tally
es. Estimate: @ 5 minutes

on time needed for
ibutes, entities, sometimes
every card, numbering
ing main entry and cross references,
roxed articles, numbering
cles. (Fitch) Tally on 100
timate: @ 2 minutes

on time and xerox supplies needed to
reference cards (Haffenbredl),
cards by categories (Haffen-
collate and distribute
lists of cards (Hafner),
(Haffenbredl) & documents (Hafner) in
Tally on 100 samples.
6 minutes per card.

each turn in
8 entries a month.
Daley April 15 on input.

ganize infor-
and write
How we
Add
May 31 trial
Write
How we
SRS to be set up.

Decision to
continue system
or make changes.

April 30 | May 1 - May 31, 1969 | June 2, 1969

Locate in the library:

Staats, A. W. et. al. "Motivated learning" reading treatment with subprofessional therapy-technicians.

Bring this material to the librarian.

Locate in ISRS reading review entries:

Information on behavioral objectives. (one entry only)

Bring to the librarian.

Locate in ERIC:

ED 29493

Bring a print-out of the abstract to the librarian.

Locate in the library:

Homme, L. A behavioral technology exists here and now.

Bring this material to the librarian.

Locate in ISRS reading review entries:

Information on System Analysis. (one entry only)

Bring to the librarian.

Locate in ERIC:

ED 29486

Bring a print-out of the abstract to the librarian.

METHOD OF REFILING MAIN ENTRIES AND CROSS REFERENCES WHEN A TERM IS ADDED OR DELETED FROM THE ISRS TERM FRAMEWORK (Reading review entries)

Additions:

1. All entries that will be filed under the new term are in the term directly one level above; for instance, if the new term is on Level 3, all entries which will be refiled under the new term are under the Level 2 term immediately above.

2. Go through all main entries under the Level 2 term and determine which of these should be refiled under the new term on Level 3.

3. Go through the cross reference cards under the Level 2 term and locate the main entries for these cross references.

4. Determine which of the main entries indicated on the cross reference card should be cross referenced under the new Level 3 term.

5. Make new cross reference cards for those main entries which are to be cross referenced under the new term.

6. Destroy old cross reference card.

7. For each main entry that has been refiled, replace the main entry with a card which says:

   Main entry(entry number) has been refiled under(new main entry address).

   This will enable system users to locate the main entry indicated as a cross reference throughout the system, even after it has been refiled in a new location.

Deletions:

1. All entries filed under a term which is deleted will be refiled in the term directly one level above. For instance, if entries were filed under a Level 3 term which has been deleted, all entries will be refiled under the Level 2 term directly above.

2. In order that cross references to the main entries which were filed under the deleted term may be located, a card is inserted behind the index for the old term. The card says:

   All entries filed under (deleted term) have been refiled under (new address)